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HISTORY *of* COLORADO

Prepared Under the Supervision of
THE STATE HISTORICAL AND NATURAL
HISTORY SOCIETY OF COLORADO

JAMES H. BAKER, *Editor*
President Emeritus, University of Colorado

LEROY R. HAFEN, PH. D.
Associate Editor
Historian, State Historical and
Natural History Society

TWENTY-FOUR SPECIAL CONTRIBUTORS



THREE VOLUMES

(With which are issued two biographical volumes
written and edited by the publishers)

VOLUME I.

PUBLISHERS
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DENVER, 1927



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PREFATORY NOTE

In 1925, the present publishers requested the State Historical and Natural History Society of Colorado to undertake the preparation of a History of Colorado. It seemed to the Board of Directors of the Society that there was a real need for such a publication, if written by men of special knowledge and training; and the work was undertaken in commemoration of the then approaching semi-centennial of the admission of Colorado to statehood.

Dr. James H. Baker was selected as Editor, with LeRoy R. Hafen, Ph. D., the Historian of the Society, as Associate Editor. The plan of the work was determined upon, and arrangements for the preparation of the various chapters were made. The death of Dr. Baker, in September, 1925, was a serious loss to the State. Fortunately, however, for the present History, the work had advanced to the point that its completion as planned was not permanently affected. The editorial work was taken over by Dr. Hafen, and carried on and finished with ability. A special committee of the Society, with Dr. A. J. Flynn as Chairman, devoted much time and labor in aiding to bring about the present publication.

Too much cannot be said in praise of the authors of the chapters which constitute the History. They are recognized as specialists in their various fields. All of them contributed their services without compensation, and their fine work is a donation made from a love of Colorado and from a desire to produce a result of which the State could be proud.

The History, as prepared by the Society, consists of three volumes. With these are published two volumes of biographical sketches prepared and edited by the publishers.

The thanks of the Society are due to many people who, in various ways, have aided in the work. For illustration, the Denver Public Library kindly assisted in the onerous task of preparing the index.

HENRY A. DUBBS,
President.

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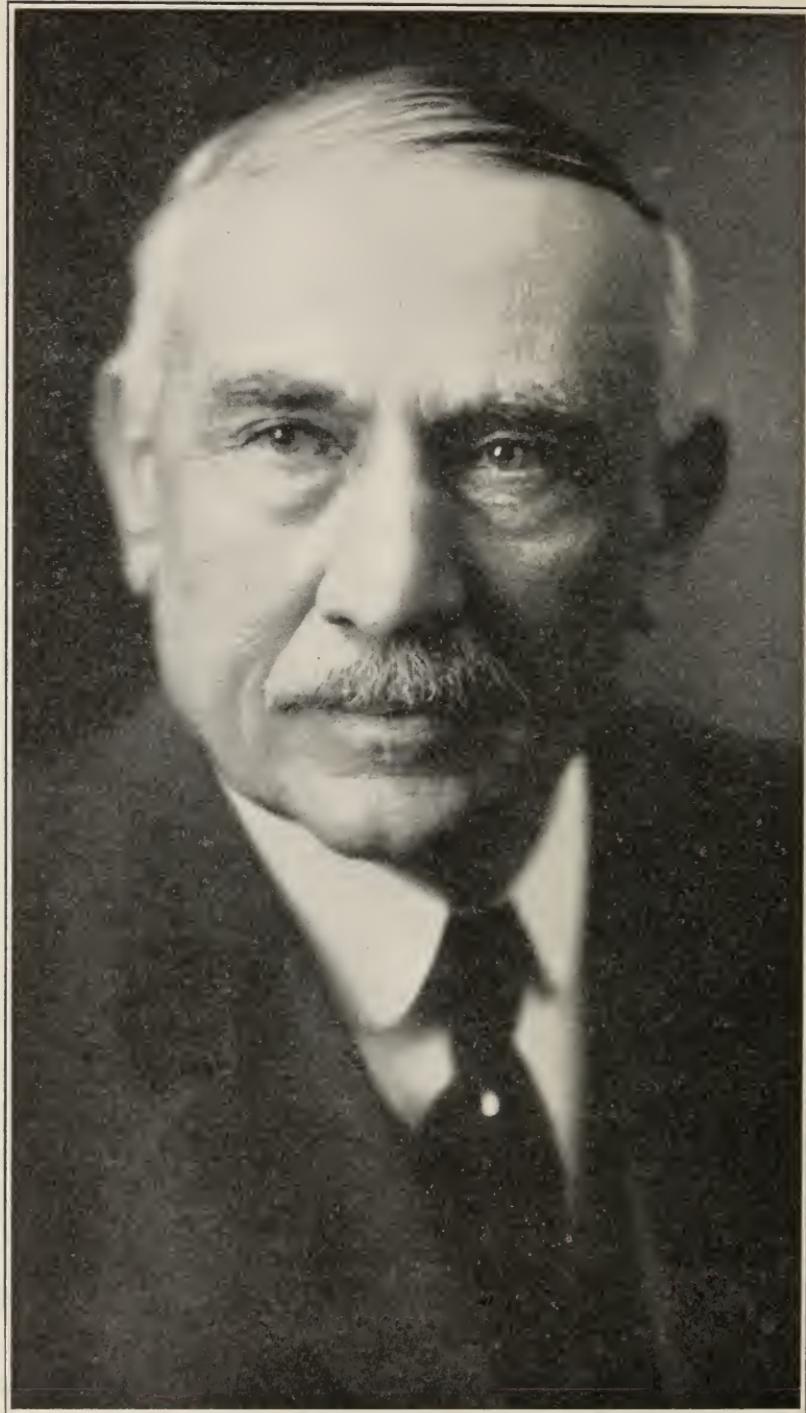
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JAMES HUTCHINS BAKER, LL.D.
President Emeritus, University of Colorado

CHAPTER I

INTRODUCTORY OUTLINE

By James H. Baker

FIRST IMPRESSIONS OF COLORADO—WAYS OF READING HISTORY—GEOLOGIC INTEREST—NATURAL FEATURES, NATURAL HISTORY—IMPORTANCE OF ARCHAEOLOGY—HISTORIC BACKGROUND—FROM SETTLEMENT TO STATEHOOD, 1859-1876—DEVELOPMENT SINCE 1876—EDUCATION—OTHER CULTURAL AGENCIES.

I came to Colorado in 1875. First impressions do not belong to real history, but they may have a place in defining a new environment by contrast. The West knows itself more fully when it considers the Eastern viewpoint. One born and reared in New England has the ideals but also the prejudices and provincialism of that section. His standards, his religion, his education are the product of the Puritan history and influence. The importance of his corner of America looms large in his imagination. The sudden transition to entirely new surroundings, physical and social, was interesting, sometimes even startling. Everything different made an indelible stamp. A few impressions are briefly recorded only that Colorado may read its history, made commonplace by familiarity, with keener interest and understanding. The spiritual reality of things often appears at first view.

In physical features Colorado is a favored spot. Sea or forest or mountain calls with a magic voice. Nature in its striking aspects has an aesthetic meaning, and more, it makes an impression on character. The mind tends to grow into harmony with beauty and grandeur. The National Hymn was supposed to represent America, but describes only the varied beauty of the East with "Its rocks

and rills, its woods and templed hills." On approaching Colorado, the broad plains, the first glimpses of Long's and Pike's peaks, the vast stretch of mountains, the snowy range were in thrilling contrast. In the clear air, a walk from Denver to the foothills before breakfast seemed feasible. The first trip, up Clear Creek, on a platform car of the narrow-gauge afforded at every curve a changing vista like a gigantic moving panorama. Later, extended excursions revealed a variety and a sublimity which found a ready mental response, and became a permanent inspiration. This does not rise to the poetry of two well-known men on their first visit to Colorado. One of them, beholding herds of cattle on the plains, said, "In the light of the setting sun they seemed like golden cattle pasturing on the azure and feeding on the blue." The other spoke of the "mighty mountains towering up to the throne of God."

The people in Denver and other leading towns had come together from various parts of the country and from some foreign countries. All were adventurous, many were highly cultured and had sought Colorado for climatic reasons. Some represented the far reach of the German migrations of the forties and earlier. You could distinguish by varieties of speech men from Massachusetts, Virginia, or Georgia, men from the Old World. The Middle States contributed their quota—a second migration across from the East. Every group represented the traditions and pride of its native state or country. Each had its social conventions, political ideas, moral standards, and religious views. We refer to the substantial classes of the more settled communities. But there were also adventurers about whom it was more than impolite to be inquisitive, promoters of "salted" mines, eccentrics of whom Colorado has always had its share. Indians, prospectors, occasional vagrants were seen on the streets. Tragedies were not uncommon. To transform a Yankee into a cosmopolite is a tough process—and a similar thing may be said of any people. In the case of the writer the process began at once. He soon discovered that the Indians on the streets were peaceful, wearing no scalp locks, the liquor dealers were often educated and public-spirited citizens, the Southerners were not irredeemable rebels, Episcopalian were

better than painted by "Dissenting" Protestants, and Catholics were not as inferred by zealots from a passage in the Apocalypse. In a mixed community, such as described, non-essential differences disappear, ideas are exchanged, tolerance grows from new contacts, the view is broadened. The composite communities meant much in forming the character of the State. The commingling of different groups of the same stock makes for progress. The mind is liberated, new ideas spring up, constructive work follows. No doubt the country is being revitalized by Western thought. We are reminded of an occasion when a professor in a noted old university, being patronizing and quizzical, was told bluntly that his section of the country was provincial and his institution was handicapped by traditions, that many a Western university was progressing with the advance of a progressive people, and that the West was working out problems of our democracy in essential ways with coming results that would awaken and surprise him. Fifty years ago, one was impressed with the new things, the spirit and the hope. The people believed this would be the land of broader chests and brighter brains. They were ready to "grow up with the country." The schools and years of association have standardized and harmonized many things. Colorado has become a commonwealth. From the somewhat unconventional social life of the early days society has become formal—and, perhaps, at a loss. The wandering opera troupes of '75 have been followed by the renowned singers and actors of the world—and this is typical of the general development. To counterbalance any possible false impressions, we may say that those who came from New England brought with them things of permanent value, ideas of the standard virtues, appreciations of culture, belief in mental discipline and moral training, and a historical perspective that took in the "Beauty that was Greece" and the "Glory that was Rome." In an important sense Puritan standards have become the public standards of America, and you will find more of New England in Colorado Springs, Boulder, or Greeley than in most towns of Massachusetts. This is not a partisan claim, but recognition of a fact.

From the status of education much may be inferred re-

garding conditions in Colorado. With the possible exception of Boulder, Denver had the only high school. There were 20,000 school children in the Territory, of whom only one-half entered school and of these only one-half were in school 116 days in the year. Secondary and higher education by the State was opposed by many. The State University, the Agricultural College, the Normal School were not opened. The School of Mines was not on a definite basis until 1879. Colorado Seminary was only the forerunner of the University of Denver. Colorado College had been opened with a preparatory department in 1874. The first meeting of the State Teachers Association was opened in Denver, December 28, 1875. This meeting was significant because it was the beginning of the Association of today, because its membership included many who will live in Colorado history, and because it had to do with school laws to be embodied in the Constitution and to be enacted by the last territorial and the first state legislature.

The year 1875 marked a period of depression. Leadville was not yet discovered, and mining prospects seemed doubtful. The future of cities and towns was uncertain. In Denver people would neither buy nor build. Many who later became wealthy and prominent and owners of substantial residences—now vanishing landmarks—were living in comparative poverty, and “doing their own work.” Agriculture and horticulture had made beginnings, but faith in the future of these occupations was not sure. This was a mining region, it was said, and with mining would go the prosperity of the Territory. However, men like Governor Gilpin, Governor Evans, Governor Hunt, and Bishop Spalding, and some others who knew what made cities and what were the resources of Colorado foresaw and predicted the State that was to be. In spite of the uncertainty, there was a stubborn hope and an energy stimulating to newcomers. Here was a large application of the old adage regarding perseverance.

The year 1875 may be taken as marking the end of a period. It is a convenient standpoint from which to look back and forward, to see the early stages of growth and the later progress. This date was still a time of beginnings. The people had not fused into a real commonwealth. The

“public good” made no strong appeal. But we have seen in later years a gradual growth of public spirit, of generosity, of wise legislation, of pride in our institutions. And fresh and interesting adventures are ahead for the new generation. Seed time and harvest have each their attractive interest. Planting and cultivating call for courage and faith, but there is a satisfaction in creative work and in looking forward.

How to read history may seem to be incongruous as part of a history. But either the pictorial skill of the writer or the imagination of the reader must make a kind of photoplay from essential facts, if they are to be studied with full interest and profit. Carlyle, in his French Revolution, boldly made a departure for which only his genius could command recognition. Tragedy, irony, comedy are there. Human nature at its heights and depths lives in its pages. Events are staged with intense dramatic effects. Facts are clothed with spirit. You see the flame of the “burning bush.” Van Loon’s Story of Mankind is a more conservative departure, but has the style of interesting literature. Accuracy is maintained, but color is added. Youth is attracted by it, and the adult gets new insights. History should be read as if one were dwelling with the peoples and events described. One who has lived with the scenes and changes in Colorado understands the chronicles of the State. He has seen the remains of prehistoric peoples, become familiar with the Indian customs, listened to the legends of the pioneers. He had stood on mountain heights and surveyed range, dome, peak and cañon. He has seen the trout leap in the mountain streams, and the stealthy movements of the elk gliding into the safety of the forest. He has seen flowers piercing through the snow above timberline. He has admired the reds and grays and purples of the foothills, changing under light and shadows. He has regarded clouds and mists on mighty summits with an “Old Testament feeling,” as if beholding the mount where God gave His Commandments. He has followed the growth of political, educational, and religious institutions. This generation may still view the scenes, but needs the visualizing power for past events and the men who played a part in them.

History repeats itself, not in cycles, but does repeat itself by recurrence of like events under like conditions. In this sense the development of Colorado may be compared to an unfolding pageant of the nation's history and of many parts of world history. The settling of the colonies along the Atlantic, the dealings with the Indians, the push beyond the Alleghenies, the forming of territories and states, in likeness are repeated here. The story of the quest of the "golden fleece," of the planting of Greek colonies, of the early European migrations gives clearer meaning to our pioneer days.

That Colorado's record is dramatic and in ways unique has already been stated. All the elements of human interest are here. Here is the background of forgotten races, of primitive civilization, of discovery, of adventure, of colonial experiment. All the problems of democracy and of civilization are present with their insistent demands on responsible citizenship. Pride, constructive energy, distinctive contributions to progress belong to each state. Under our form of government, state consciousness is necessary, unless the states are willing to lose their constitutional rights and allow them to be assumed by an increasingly centralized government. We cannot too fully emphasize that we are here for homes and schools and churches of our own, for wise legislation, for a civilization in which we may take pride, that by building well our institutions we also contribute to national interests and to world ideals.

The geology of Colorado, as compared with that of almost any other state, has a peculiar interest. The mountains give a distinctive character to the region, modify living conditions, and affect the traits of the people. It is fitting to begin this history with the geological record. That record describes, as it were, the foundation of a magnificent superstructure.

Along the foothills are great opportunities for illustrating textbook knowledge, studying the evidences of geological periods, and learning how the earth's crust was formed. The leaves of the record are upturned, easy to read. The evolution of plant and animal life is printed on the pages. Many years ago it was the privilege of the writer to take classes in elementary geology to the mountain border for

field study. After a survey of the formations, we gathered at the edge of the primitive rock and imagined the first appearance of the mountain line above the sea. We imagined the growth of deposits at the sea bottom and the gradual subsidence, making an area more easily yielding to lateral pressure, the crumpling and the upward thrust of mountain making, the sculpturing into wonderful forms which appear today as "the everlasting hills." We imagined the dawn of life, the higher and higher development of organic forms, the conditions of the coal age, and followed through to the present age with plant and animal life as we know them. The interest was intense, because the subject commanded interest. Those classes got a lasting impression of the mutations culminating in man and of the physical foundation for man's achievement.

To describe scenery that is familiar is unnecessary. To liken Colorado scenery to that of Switzerland is saying too much and too little. Here the grandeur, the beauty, the atmosphere, the sky have their peculiar attraction, not easily exaggerated in words. Years ago the writer saw Bierstadt's paintings of the Rockies, and, before beholding the reality, thought them unnatural and overdone. He has read Stevenson's experience in camping under the stars, but had a greater under Colorado skies. Mountain climbing, fierce thunderstorms when benighted in some high trail, winter snows, fields and banks of flowers in valley or park or on the mountain side have added to his experience. Familiar with our columbine, you can do without the "Alpine rose." If you have stood on Arapahoe, you can do without the view from the Rigi. The sunsets are hardly surpassed by the "Alpen-glow." No wonder Colorado is called the nation's play-ground! The legends regarding the names of cañons, streams, and peaks would make an interesting volume. The names, applied by the Indians and the Spaniards, by the explorers and the first settlers, have been revised and given formal recognition, but some confusion is still found. The State Geographic Society is making corrections and recommending changes—with just consideration of disputed claims.

A certain newcomer to Colorado thought that in this "arid region" plant and animal life would be scant and

few species would be represented. Accordingly in the spring he started to analyze all the flowers as they appeared. But nature soon overwhelmed him—the fate of those who are presumptuous before the gods. He learned that, although a part of the "Great American Desert," Colorado was teeming with life, life that brought here scientists like Alfred Russel Wallace, and mighty hunters like Theodore Roosevelt, lovers of nature, and seekers for the novel. Gradations of altitude nurse varieties of plant life that near the sea level would cover many degrees of latitude. Everywhere, in season, the banks of flowers are poems to be read, not described. Along the ravines is a profusion of shrubs, the glory of old gold running along their tops in the leafless autumn, transmuted to gray in winter and into emerald in the spring. Our adventurer soon learned something about local fauna. He saw herds of buffalo on the plains, antelope grazing peacefully with the cattle on the outskirts of towns, the mountain lion crouching defiant on some ledge, the mountain sheep leaping from rock to rock, listened to old timers' yarns, with credulity or doubt, heard a certain haunting bird note, omen of spring—and his education was further broadened. The chapter on Natural History is a proper and necessary part in showing the real Colorado.

The attitude with which we approach historical study is important. If we regard events as a series of fateful changes, or as cyclic, a repetition of growth and decay, we are left hopeless and pessimistic. If we adopt the mechanistic theory of life instead of the purposive we are again in the hands of blind forces. If we hold that upon the whole change means progress—steps forward with occasional backward slips, but progress—the outlook brightens. It is a vital belief that *mind* is found in evolution and *will* in man, and that reason and will contribute to human advance. The evolutionary view gives hope for the future and enables us to dimly foresee events and help construct or guide them—and this applies to Colorado as to the world. The dogma of evolution is not thrust on the reader in any particular form, he is only asked to view life as an "ascent."

Archaeology is essential in the study of man and his institutions. In the future history will be written as the

development of life and civilization and largely from evidence reaching far back of recorded time. The archaeologist locates certain discoveries chronologically by the estimated age of the formation in which they are imbedded. Scientists, for their theory of evolution, refer for instance to skeletal remains belonging to remote periods: those of a being "erect" and having some semblance of man, 500,000 years old; those of a "manlike" being, 250,000 years old; remains of a higher type belonging to the last glacial period, 50,000 years back; remains of the "true man" (*Homo sapiens*), existing perhaps 25,000 years before our era. Accompanying these finds are implements, at first of crudest make, but with successive ages becoming more highly finished, more numerous, and more widely adapted—up to the age of metals and the use of tools for diversified needs. Scientists in this field, from numerous evidences, are able to infer the life of given periods, whether settled or nomadic, the means of living, the customs, the degree of human intelligence, the growth of speech. In short a rough outline of the evolution of man and the beginning of civilization preceding recorded history has been made. All is due to researches like those of the archaeologist and the anthropologist.

The peopling of America is a subject fuller of interest than of knowledge. It is conjectured that migrants of the "mongoloid" type came across from Northeastern Asia by Behring Strait or along the Aleutian Islands and gradually drifted southward. The first migration may have occurred 10,000 to 15,000 years ago. It is agreed that the American Indian belonged to a late age, probably the "neolithic." The race did not develop from early stages here, for no acceptable evidence of "sub-men" has been found on this continent.¹ Coming a step nearer, peoples using forms of the same basic language settled along the plateaus and mountain valleys from Montana into Mexico. It is natural to suppose that the first prehistoric peoples of the Southwest, including those of the part of the San Juan District lying in Colorado, were related to them. The chapter on "Ancient Inhabitants" is concerned with the Colorado Section of the

¹ A. V. Kidder, *Southwestern Archaeology*, 118-119.

San Juan District. The remains found in Colorado and adjacent regions—the earliest perhaps 4,000 years old—are classed as belonging to four periods: those of the Basket Makers, the Post-Basket Makers, the Pre-Pueblos, and the Pueblos. The early inhabitants were more or less nomadic but gradually passed to a more settled state, as shown by permanent villages and evidences of agriculture. The study of remains in Colorado is proving to be of high value. An excursion through half a million years from the *Pithecanthropus erectus* to the Colorado Pueblos may seem long and tedious and useless, but it helps to give a meaning to our own discoveries.

A United States senator on one occasion was approached concerning an appropriation for the Smithsonian. He replied to the argument that he was profanely more interested in living New Yorkers than in dead Indians. This illustrates the attitude of many who do not understand the value of delving into the past as contributing to knowledge regarding man and his problems today. Toward archaeological research in Colorado the same apathy exists. Here is a large field which, fully investigated, will yield interesting facts, facts which may add substantially to the knowledge of primitive races in America. "I know of no other area in the Americas, with the possible exception of Peru, where all the steps in the development of a people from nomadic savagery to a comparatively high degree of civilization can be traced so accurately and with such a wealth of detail

* * * We must use our results for the solution of those general problems of anthropological science without a true understanding of which we can never hope to arrive at valid conclusions as to the history of mankind as a whole

* * * If we could apply dates, even if only approximate ones, to the main stages of Southwestern development, our historical perspective would not only be greatly sharpened, but we should also have acquired data of the utmost value for the solution of many of the broader problems of anthropology, such problems, for example, as those of the rate of acceleration in culture, the rapidity of the spread of culture traits, etc."²

² Ibid., 131-133.

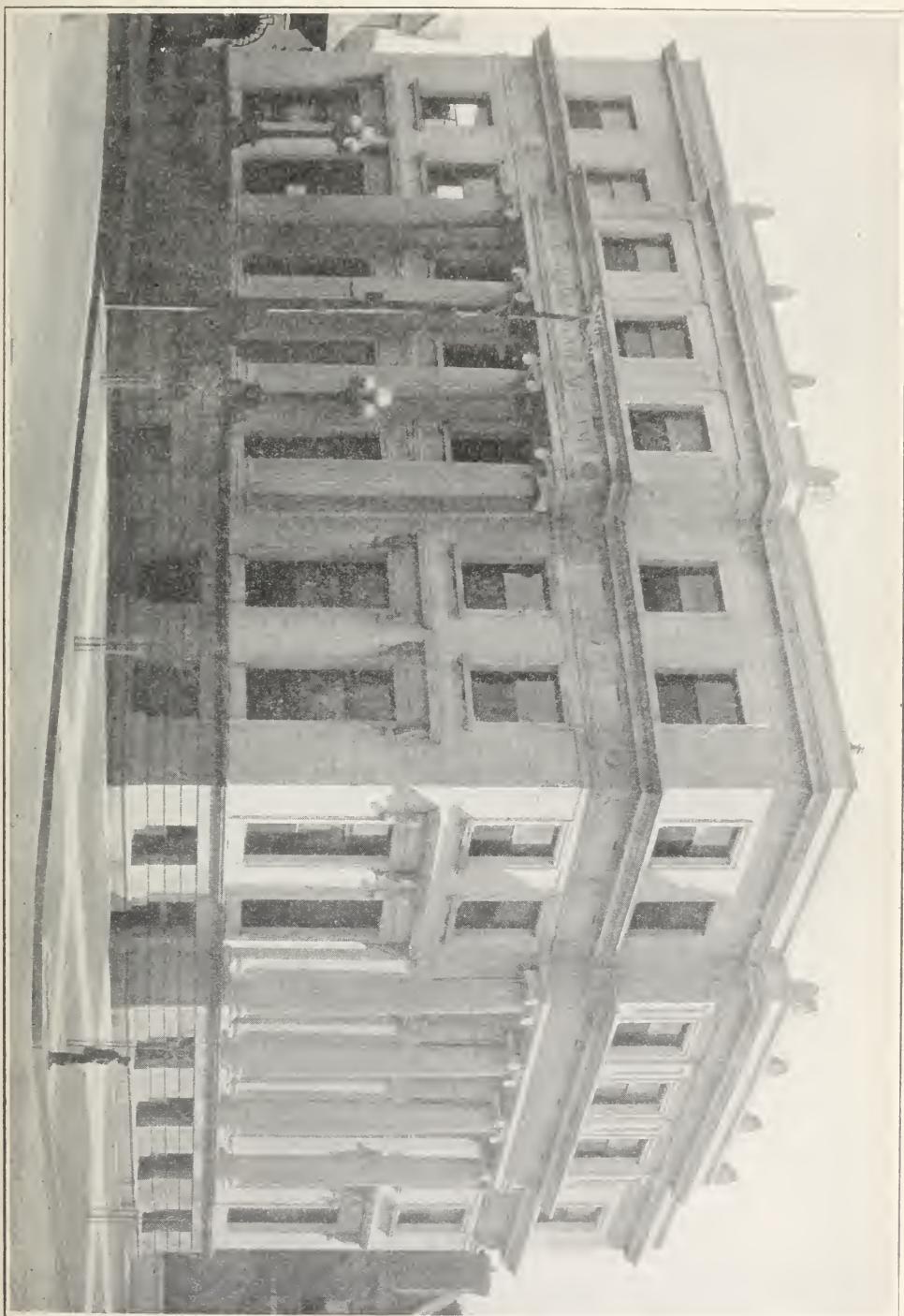
The period from Coronado's expedition in search of the fabled Seven Cities and the land of Quivira to the "Pike's Peak Excitement" covers more than three centuries, 1540 to 1859. Coronado may or may not have crossed what is now Southeastern Colorado, but this is a point of no material value. The expeditions up to 1806 which neared or reached Colorado were mainly Spanish. After Coronado's failure to discover any "El Dorado," there was a long period of inactivity, but a later revival of interest leading to many expeditions which, however, effected no permanent settlements within the limits of what became Colorado. In the eighteenth century, the French made several expeditions into this Western territory, some of which entered Colorado. From 1806 to 1853 came the expeditions of Pike, Long, and Frémont, nearly all under the direction of the United States Government. The prosperous time of the trappers and fur traders was from about 1822 to 1845. In 1851 a permanent Mexican settlement was made in the San Luis Valley.

The record of these centuries simply describes the background and setting of the history beginning in 1859. It has a human interest, like all stories of adventure, real or fictitious. There is the motive of greed sometimes tempered by religious zeal. There is astonishing credulity and a wild play of imagination. There are hardships and disappointments, often beyond human endurance. The ignorance and superstition of the early explorers belong to the time of giants and dragons. Even in 1752 a Frenchman published a map showing a gulf reaching from the "South Sea" far inland and covering a part of Colorado. We remember, however, that Columbus believed he had reached Eastern Asia, and that the English and French settlers thought the upper part of North America was continuous with Asia and that there was a broad waterway reaching to a Western Sea. Of course later explorers began to correct this fantastic geography, and the surveys made by the government in the first half of the last century correctly located prominent physical features.

The results of the movements of three centuries were, as related to Colorado, almost nil. The Spanish left here no enduring colonies. The French came and disappeared.

The fur traders abandoned their posts. Even near the end of the time noted, white settlements were few and insignificant. To be sure the reports of the Government expeditions gave information that was useful and of permanent value. The trading posts incidentally made guides and scouts. The trappers marked our trails that became the lines of roads and railways. The traders were necessarily a rough class, often dishonest or criminal. But among them were men who became renowned for character and hardihood. And throughout this long period of discovery, there were many examples of real heroism. There were men who reached out for objects worthy of their energy—something fully satisfying. They had something of the spirit of the Magellans, Amundsens, and Pearys. They followed in their way the innate impulse which more or less consciously reaches out toward whatever is true, beautiful, or good. Of such were the men who finally subdued and peopled the Continent.

The migration to Colorado was not in the way of frontier expansion, not a search for more fertile valleys or a nomadic wandering for new pastures, not a flight from political or religious oppression. The movement was due to the disposition of men everywhere to gamble with fate when the stakes are high. It was with the hope of the good luck which would mean homes and comfort, perhaps wealth and power—hope which sustains men on the long trail. Some were to be fortunate and successful. Some were to meet insuperable obstacles or overwhelming tragedies, terrible beyond the power of language. Some were to turn backward with curses for man, fate, and the gods. There were strong men with the stuff of heroes, men who conquered all but the impossible, who won by will when all was lost but will. Those who survived this testing process were the men who finally remained and made the State. The names of the chief of these in every profession and leading occupation were familiar throughout the Pioneer Period and have a permanent place in our history. Those days made great men. The Pioneer history of Colorado is all the more striking because the colonies were isolated, far from well-settled frontiers. They were self-reliant because self-dependent. We must not omit from



the picture the inevitable refuse of such movements. We may quote aptly from an account of the First Crusade: "No wonder that a stream of emigration set toward the East, such as would in modern times flow toward a newly discovered goldfield—a stream carrying on its turbid waters much refuse, tramps and bankrupts, camp-followers and hucksters, fugitive monks and escaped villains, and marked by the same motley grouping, the same fever of life, the same alternations of affluence and beggary, which mark the rush for a goldfield today."

From 1858 to 1860 the foundation of Colorado was laid. Rich diggings and mines were discovered. Many of the permanent towns were founded. Mining brought the people, the people called for agriculture and livestock. Agriculture depended largely on irrigation. Transportation was a necessity, "stores" for all kinds of supplies were demanded, mail communication soon followed. Schools and churches must meet intellectual and spiritual needs. Anarchy must be replaced by law, however informal and crude. There must be district, county, and territorial organization. In brief all the fundamental needs of Colorado today were here in 1859, and in a fashion were met. In other words here was the State in embryo.

Material needs are first and this is evident throughout the early history. "Man must live before he can live well." Economic Welfare is fundamental to civilization. Mercantile enterprise, freight conveyance, mining, farming, stock-raising, irrigation were outstanding interests. Throughout the territorial period we find legislation for the promotion and protection of some of these interests. Associations were formed to reach the same ends. Mining laws were made to clear up the many intricacies of claims and rights. Mountain passes were surveyed—ways for the little narrow-gauge railroads and the trains that began to climb the steep grades as early as 1870.

If any first-comers held to theoretical anarchy, they soon found it was not a thing for practical use. In all the important mining camps "spontaneous legislation" was found necessary. "Miners' Courts" dealt out crude justice to criminals, and the criminal code was adapted to the peculiar conditions of camp life. The "People's Courts" with a

larger jurisdiction were roughly organized. When there was a special call for vigilance committees "Emergency Courts" were formed for the occasion. Formal and legal organization was needed. The Colorado country was all within the limits of Kansas, Nebraska, Utah, and New Mexico. The people began to consider the making of a new state to be carved out of the four territories named. When this attempt failed, they took the matter in their own hands and without authority temporarily established the Territory of Jefferson, chose officials, made laws, and enforced them. This action led to the constitutional Territory of Colorado in 1861 and to the State in 1876. There was never a bolder conception, successfully carried out, than that of forming the provisional Territory. The Capital wandered to Colorado City, to Golden, and back to Denver where it finally remained.

"Man lives not by bread alone." The settlements contained cultured men—all brought the traditions of an established order, of all the institutions of civilization. William N. Byers, that remarkable pioneer, in 1859 established the *Rocky Mountain News*. He was the staunch defender of all the better interests of the new settlements and a persistent builder of the future Colorado. Then began the interest in schools. The picture of Goldrick, the first schoolmaster, clothed in broadcloth, silk hat, and kid gloves, driving his oxteam into Denver, is dear to all Coloradoans. His advent was followed in 1862 by the beginning of the public schools. The churches did not linger behind the other cultural efforts, and they began substantial work as early as 1859. Many charitable, religious, educational and fraternal orders were on the ground as early as 1860. In that year was formed the first medical society, and the first hospital was opened. Until the coming of statehood there were repeated attempts to improve the school laws, and state educational and other institutions were founded or projected.

The real Territory was fortunate in Gilpin as its first Governor—a man eccentric, visionary (his dreams often came true), courageous, able, and useful. His bold risk in organizing companies for the Civil War without government authority probably saved three territories to the

Union and also dissipated the dream of a "Western Confederacy." Governor Evans, strong, with a high degree of common sense, patriotic, stood out prominently in his work as Governor, as in many other activities for Colorado. Routt, the last territorial and the first state Governor was a striking character in person and in his shrewd and successful administration. The Indian War, from 1864 to 1868 occupies a large place. It was waged by the plains Indians against the rapid encroachments of the whites. The distractions of the Civil War seemed to make a favorable opportunity. The "Sand Creek Massacre" by white troops was an incident of this war. It was the result of extreme exasperation at Indian cruelties. The discussion of the tragedy has not wholly ceased, but the weight of public opinion condemns the wholesale slaughter.

In 1870 two railroads entered Denver, the Denver Pacific and the Kansas Pacific. This was an event of first importance in enlarging the possibilities of the Territory, and in increasing the hope and courage of the people. In 1875 agriculture had been well developed, many orchards had been planted, stockraising had become a powerful interest. Many rich mines had been opened. Government, schools, and churches were well established. In short, in the minds of those who could foresee and judge, a great State was assured. But 1875 was a year of depression and doubt. Leadville was not yet discovered. The panic of 1873 was felt especially here in 1874-5; the Black Hills excitement was beginning to take away the population; it was a "locust year" as were 1874 and 1876. But the foundation of Colorado was too firm for any great disaster or permanent damage. With statehood, new mining discoveries, and good crops hope revived and Colorado entered on a new life.

A writer of note has said that the history of Colorado since 1876 is almost entirely a record of material growth. The material side of course is worthy of full treatment, and it is annually set forth in high colors in every New Year's edition of the local newspapers, while a summary of all the significant events of the preceding year is seldom found. The above statement is wrong; the past fifty years have seen vigorous movements in all lines of progress. Material

civilization in a sense is fundamental but is not the superstructure. We place Greece before Phoenicia and Rome before Carthage because Greece and Rome displayed in high degree elements of culture that live and influence the world. Great as is the economic growth of Colorado, its institutional development is greater.

America boasts of her bigness, her wealth, her power. A European visitor, ranking high in literature, came to an American city, renowned for its giant strides. He was shown the endless stockyards, the palace hotels, the lofty buildings—all with glaring price tags attached. Nothing was said of the schools, the churches, the charities, the art and literature. At the end of a day he said, "Gentlemen, are these things so? Then I am sorry for you, for you are barbarians"—and he poured out contempt for the spirit that exalted mere bigness. We are willing to parade our prosperity, but we will also display our choice possessions.

A people live in history as they have represented the political, cultural, and moral values—as Greece represented art and literature and philosophy, and Rome juristic and political organization. If Colorado had failed in evolution of these values, her history had not been worth writing. We shall later try to show that her advance in other things is as striking as in the use of resources and opportunities, as striking as the mountain heights that yearly bring increasing crowds of tourists who wish to "see America first" and include Colorado in their itinerary.

Anyone who wishes to note the increase of wealth can find endless statistics—and this phase of progress reveals much that is essential in the character of a people, such as ambition, courage, endurance, creative instinct, duty, ideals expressed in the concrete. It may be even exciting to trace agriculture from the first vegetable patch to the vast extent of skilled and scientific farming, irrigation from the little furrows carrying trickles of water from a near creek to the great network of irrigation canals and ditches watering broad areas, livestock industry from the few wornout oxen, fattened for beef, to the "cattle on a thousand hills," and the herds of blooded stock. Then mining, the cornerstone of the State's foundation, might be traced from the specks of gold discovered in some creek bed to the millions of

wealth in the far extended veins followed in underground galleries, from the Mexican arrastre and the "woodpecker mill" to the latest scientifically organized reduction works. Means of transportation grew from the "bullwhackers" prairie schooner to the steel-clad coach of the "Colorado Special." The first "stories," shacks housing as many varieties of stock in trade as there were of animals in Noah's Ark, were the precursors of the emporiums of today. It is a far range from the first bank where miners sold their gold dust or deposited their meager funds to the marble structures holding millions in their vaults. Romance enough in all this, if we consider the "hidden lanterns at the belt," the secret inner joy of creating and possessing which make poetry of life, even of commonplace, practical life.

(1) In fifty years, there have been great changes toward liberal government and justice between classes. In these movements the United States and most states of the Union, including Colorado, have shared. But each state has its own way of meeting current questions and we believe that Colorado has kept up with progress and in some cases has been in the van. To describe movements is not to endorse or condemn them, though the writer believes that advance is being made toward a desirable goal, for which we must ever struggle, but which we may never reach. The world is in danger from both blind conservatism and wild radicalism. There is a middle ground for common understanding and coöperation, and safety lies with the mind open to truth and right. Oligarchies there must always be, groups of efficient leaders in whatever class and in whatever form of government, and this is true even of communism. In 1876 dominant political ideas were unfavorable to the growing demands of labor. One is reminded of the attitude of owners, statesmen, churches, and universities in England at the time of the reform bills, nearly a century ago. Then the cry was "Interference with freedom of employment." The same cry was raised here a half century ago. (2) Before taking up the political and social changes, we may refer to the increasing stability of government. In the settled order today, the time of "Emergency courts" with their swift justice, of "Spontaneous government" seems remote and

strange. The illegal organization of territorial government seems like an extravaganza of some wild Irishman playing king in a South Sea island. The South American republics passed through a long stage of experiment and revolution before they became established and peaceful. In a different way and in a different degree the embryo State had to pass through various stages toward stability. We have left behind "capturing" of railroads, abduction of judges, the worst type of political bosses, and the "Robber Seventh" Assembly, and now "point with pride" to a reign of law and order. (3) There have been significant changes in the character of legislation. Freedom, liberality, and occasional originality have appeared in our lawmaking, as shown by the acts for woman's suffrage and juvenile courts. From a single law, made by representatives of the people, we learn much in general and may infer the public attitude toward a vital question. If we had never heard of Tennessee, we could infer from one widely mooted law much regarding popular ideas in that State. Lest the writer may be misunderstood in what follows, he nominally belongs to a conservative party, but in practice is independent, and may be called conservative-liberal. He never forgathered with populists but he did see that they found wrongs, and, sometimes blindly, were seeking to right them. Many of their views have since been adopted by the old parties. Governor Waite was eccentric to a degree, and advocated some things that were wild or premature, but he sought to readjust the balance between the "upper" and the "lower" classes—an idea that now stands out in the political and social world. In the special session of the legislature during his administration laws which later received general approval were passed to relieve the debtor class. It was a favorite pastime to "bait" the Populist Governor, but we are far enough removed from the scene to judge calmly, especially considering the direction in which we have moved. At the time the depression of Colorado, if not of the whole country was ascribed to him, and he was execrated accordingly—a palpable injustice. The liberal tendency of recent decades is seen in such acts as those for the initiative and referendum, the Australian ballot, woman's suffrage, arbitration, the eight-hour day, workmen's compensation, in-

dustrial control, control of public utilities, "blue-sky" regulation, the protection of children, safeguarding the health of children, restriction of child labor, compulsory education. In 1895 especially, many reform measures were proposed. These acts indicate a spiritual change more significant than the economic growth. May we not hope that the "classes" have seen a new light and that a platform is being slowly constructed on which may stand in comparative amity the employer and the employed? In all this progress women, since the suffrage act, have played an important part. A score of enactments might be named which have been due wholly or in part to their efforts. In general women's influence in legislation and in all ways has been for improved social conditions. The people may be gratified at past political development, but there is no end to vital problems to be solved by each generation. Democracy on the whole is accepted as the best form of government, its danger is in blindness or indifference to its defects. Some reflections, in part from Bryce's *Modern Democracies*, may be apt. In an ideal democracy, the citizens are intelligent, interested in public affairs, ready to serve, obedient to law; men seek office to give useful service, and work to remedy all grievances; coöperation under justice results in increased opportunity for all, many small fortunes instead of few inordinate ones, a sense of solidarity and brotherhood. But in fact legislation is often influenced by money and desire for votes, party power and greed of politicians may be heedless of the general welfare, administration may be extravagant, administrative skill inefficient. But hope is found in an awakened social conscience, growth of reason, changed attitude of capital, increase of commercial virtue and civic morality. Bryce sums up the failures of democracy in substance as follows: It has failed to increase international brotherhood, secure goodwill and civic fellowship, enlist for service enough men of the best capacity, purify and dignify politics, produce contentment, and diminish class selfishness. On the other hand, in the United States at least, it has maintained public order with liberty, commanded a fair degree of constancy and gratitude, inspired patriotism and courage, and secured legislation for the poorer classes. Whatever is said of democracy in general

and particularly of the United States applies to Colorado. Whatever is said of politics and political responsibilities, of civic duty applies to Colorado. Whatever are the essential problems of civilized countries today are problems here. We can not escape our individual share in promoting state progress, national welfare, and international comity. We are given a part to play on the world stage. (4) Cultural growth has been strong and healthy. Schoolmaster Goldrick and Boulder's schoolhouse are preserved in our museum of memories. The cactus-clad and gopher-burrowed sites of many a college campus are only dim pictures. The school conditions in 1876 are merely matter for retrospection or landmarks to show how far we have come. Today we have scores of thousands of children, thousands of trained teachers in buildings that a few decades ago would have been called magnificent and extravagant, college grounds adorned with monumental structures in classic, Gothic, or Italian architecture. The best young graduates of America and Europe fill college chairs. School laws have been revised and adapted to meet increasing needs, and in accord with new ideas. There are health examiners, pensions, union schools, transportation of children. There is a state historical society, and a state federation of women's clubs. (5) If there has been a change in remedial legislation, perhaps there has been a greater in volunteer organization for social welfare. The directory of any large town contains pages of the names of societies founded for the work of charity or philanthropy. Altruism has become more than a word or cant phrase. The churches have broadened, not only in theology and formal creed, but have added works to faith and join hands with welfare workers. In its brief existence Colorado has produced a not unworthy list of writers in every department of literature, and it may be fair to predict that with the stimulus of climate, scenery, cosmopolitan ideas, and the great men and women who pause here in their transcontinental flights, masterpieces will be produced. Then art, architecture, music—but why go on, since we have shown that material interest is but a small part of the progress of the Centennial State?

The status of education in 1875 has been noted in a previous section. The need of public schools was universally

acknowledged, though secondary and higher education by the state was not everywhere endorsed. With the coming of statehood a better code of school laws was enacted and largely through the recommendations of the first meeting of the State Teachers Association. Here, as generally throughout the country, the courses of study were fixed and promotion from grade to grade was made annually on completion of all the required work. Uniformity in the units of a school system was required, and the pupil had little or no choice of subjects. Discipline, mental and other, the harmonious development of all the powers were leading ideas. The same theories prevailed in the high schools and colleges, the courses were fixed and the influence of the classical traditions was strong.

Numerous are the theories and fads that have been adopted in fifty years—many of them abandoned. Child study, hand work as contributing to mental growth, equivalence of all studies if equally pursued, regardless of content, election of studies, individualism have played their part. The grade requirements became more flexible, frequent promotions were made, classroom discipline became less severe, and more natural and sympathetic. The curriculum was enriched, partly through the influence of President Eliot. Then came a flood of subjects and activities. By some, milking cows was held to deserve credit equally with the study of arithmetic or grammar. General education was partly supplanted by vocational. Studies in the colleges were made elective, though later the system of "majors" was adopted. The theory of equivalents was applied to college admission.

It is too early to make a just estimate of present educational theory and practice. In the older period described above, the pupils followed carefully constructed courses with a serious purpose, and gained discipline and some knowledge. Their work was not unduly scattered. They laid a good foundation for special interests and activities. The curriculum today emphasizes individual tendencies, and adaptation of subjects, and offers a large variety for the choice of the pupil. Manual-training schools, industrial schools, night schools, opportunity schools enlarge the field for vocational preparation or for the use of those who have

missed the advantages of formal education. And in the colleges courses branch toward vocations, such as teaching, commerce, and social work. We see these improvements in the present organization of school work: sympathetic study of the nature and capacity of the child, certain adjustments to his needs, better preparation for social duties, preparation for practical life for those limited by inclination, capacity, or economic conditions. The colleges and universities do well to provide for those students who are not attracted by culture as such, and they do well to broaden the campus to include the State, and offer practical instruction to all who will receive it. But in the freedom of election by immature minds, is there not danger of unwise choice, regardless of comparative values, selection of what is superficially attractive or easy to acquire? Is there not danger that the foundation subjects of number and language may be neglected to the loss of the training and essential knowledge which give strength to grapple with all problems? Are pupils trained to be intelligent, safe, and helpful factors in supporting the established institutions of civilization? Freedom of thought and open-mindedness make progress, individualism, unless resting on an established order, tends toward anarchy.

Incidentally may be inserted here reference to the State's higher educational institutions. The public generally deplores the fact that the University was "scattered," certain departments being erected into separate colleges. Be that as it may, a conservative view would regard vested rights and leave the institutions as they are, each with its own board of control. Years of controversy have roughly defined their functions and limits, and the duplication is not serious. Through conference and discussion they have come to understand and respect each the work of the others and to coöperate it many ways.

In education as in other things Colorado has been active and progressive. The Schoolmasters Club, the great State Teachers Association, now a trinity, three in one, the very large proportional representation in the National Education Association are in evidence. Colorado has furnished three or four presidents of the Association, and one or two presidents of the National Council of Education. Out of

Colorado have come many high-standard contributions to the literature of the profession. At least two national movements were initiated here. The Report of the Committee of Ten on Secondary Schools grew out of a paper and recommendation to the Council regarding College Admission Requirements. The Report, which was printed and widely distributed by the United States Bureau of Education, meant a great awakening of high-school discussion, and a relief from unendurable individual demands of colleges in requirements for admission. This Committee was followed by another which developed the present plan of equivalent units for college entrance. The study of Economy of Time in Education also began here, and led to a Report, distributed like the other by the Bureau of Education. Coöperative Committees, that of the Superintendents and that of the Universities promoted further study of the subject. The result has been investigation of every phase of economy in education and the "six-six" plan. It has furthered the organization of Junior High Schools, and Junior Colleges, and the two-year preparation for professional schools.

The subject of "Literature and the Arts" the writer regards of high importance in this history. Culture, if not the aim of life, is on the higher level of satisfaction and enjoyment. That Colorado is developing a literature might be looked upon as the consummation of our ideals. Who shall not say that life is richer for the art revealed in painting, music, or architecture? The architectural improvement is evident to all. Connoisseurs in art know the fine touches that Colorado has already produced, and the lover of music sees the wondrous change, not only in musical production and rendering, but in the appreciation of the public for the master singers, and for the stage artists. The writer remembers the vagrant opera troupe which performed in "Old Guard Hall" in 1875; he also remembers, later, Melba and Caruso and the actors Booth and Salvini, and the echoes in the minds that in growing with the state had grown in culture.

This work would hardly be complete without reference to the churches. In these days of criticism, we may fail to render just due. Without the churches, what would have been the life of the early camps and the standards and ideals

of the later decades, no one dares to conjecture. The Old Testament insights, the Christian philosophy, the Catholic authority, the protestant evangelism offer something like a firm foundation or they appeal to the inner life. Within our memory, in Colorado liberality and good fellowship between the denominations have steadily grown, and this fact promises well for future coöperation on a ground of simple truth. If anything is needed for youth today, for our own youth, it is the depth of thought and feeling that comprises "reverence." Religion is an explosive subject, but it is a form of culture. History of today must record that extremists are leaving the people in puzzlement, that the intelligent are not satisfied with *dogma*, scientific or religious, that the literature of fatalism and pessimism does not meet their need. Hard-headed men, as well as idealists, see a lack of supreme motive even for practical life and hope for a revival of a spirit of devotion. Many are seeking a ground on which all spiritual-minded men may unite. They believe there are human experiences, not merely emotional, that exalt the mind, to be studied as facts, experiences which show that the highest human welfare comes from living more or less in a "spiritual realm" even though imaginary, that rational faith may be based on man's nature, needs and aspirations.

CHAPTER II

GEOLOGY

By Russell D. George

INTRODUCTORY—TOPOGRAPHY—DRAINAGE—ROCK TYPES—GENERAL GEOLOGY—GENERAL DESCRIPTION OF ZONES—PRE-CAMBRIAN ERAS—THE ARCHEOZOIC ERA—ARCHEOZOIC LIFE—THE PROTEROZOIC ERA, OR ALGONKIAN TIME—PROTEROZOIC LIFE—CAMBRIAN—CAMBRIAN LIFE—ORDOVICIAN—ORDOVICIAN LIFE—SILURIAN—SILURIAN LIFE—DEVONIAN—DEVONIAN LIFE—MISSISSIPPAN—MISSISSIPPAN LIFE—PENNSYLVANIAN—PENNSYLVANIAN LIFE—RED BEDS—PERMIAN—PERMIAN LIFE—MESOZOIC ERA—TRIASSIC—MESOZOIC LIFE—TRIASSIC—JURASSIC—JURASSIC LIFE—CRETACEOUS—CLOSE OF CRETACEOUS—CRETACEOUS LIFE—CENOZOIC—OLIGOCENE—MIOCENE—MIOCENE AND PLIOCENE—PLIOCENE OR PLEISTOCENE—QUATERNARY—PLEISTOCENE AND RECENT—CENOZOIC LIFE—ORE MAKING—OIL SHALES—COAL.

INTRODUCTORY

Geology is a history of the earth. The historian of a nation seeks the original documents, the ancient monuments, the institutions and even the traditions of the people whose history he would write. He finds in the past the key to the present, and in the present the natural consequence of the past. He brings together the materials of the past not as isolated, unrelated facts but as the warp and woof, the design, the coloring and the motive of a great tapestry, which becomes the living background and the stage itself on which is being enacted the drama of today.

The historian of the earth is equally dependent upon the past. He must seek the original documents—the rocks, their structures, the life records, the forces which produced the condition he finds. The records of the rocky pages are

incontrovertible—unaffected, unaltered by national pride, hero-worship, hatred and jealousy. There is but one record—no conflicting transcriptions and translations, no conflicting motives of ancient chroniclers.

In earth history as in human history the light of the past fades into twilight and night, and the farther we seek the dawn the more impenetrable becomes the darkness.

In geological history there is a time when the light decreases with baffling suddenness, and though much the greater part of earth history preceded that time the volume of our knowledge of that history is exceedingly limited, and the certainty of interpretation is small. We might call this time the dividing line between the unknown and the known—between the unknowable and the knowable, for there is but little hope of adding greatly to our knowledge of the almost limitless pre-Cambrian ages.

There is but one comprehensive geologic record—a very complex one. The great continental masses are the libraries, but so far as we know not one of these contains the complete story, and it must be pieced together by careful study, comparison and correlation. If the continental records are incomplete, how much more so would be the story as told in the rocks of a single state such as Colorado.

The incompleteness of the record is due to the instability and changeableness of the earth. Even the mountains are but temporary features in the long earth history, and in the past many ranges have appeared and disappeared. Many subsidences and elevations of the land, many warpings and tiltings have caused countless changes in the relations of land and sea.

“There rolls the deep where grew the tree.

O, earth what changes hast thou seen!

There where the long street roars, hath been
The stillness of the central sea.

The hills are shadows, and they flow
From form to form and nothing stands,
They melt like mists, the solid lands,
Like clouds they shape themselves and go.”

—Tennyson.

These changes have controlled in large measure the writing of the most legible part of the earth story.

The greatest chronicler of earth history is water—chiefly marine or sea water, but land waters have played their part. The atmosphere, volcanic phenomena, climatic conditions and many other agents have added to the records but in a less important measure. And so the geological story of Colorado will be told largely in the changing relations of land and water. When water occupied part or all of the surface of the state, history was recorded in readily legible characters. When the area of the state was entirely land it was as though the pen had been lifted from the page, and we must seek the connecting links of the story, the lost act or scene of the play, elsewhere.

Just as human history is divided into eras, periods, epochs and ages by the rise and fall of races and peoples, so the local geological history of the earth is marked by events and changes which may serve to set off one part of geological time from another. As there have been very few events in human history which have involved the whole human race, so there have been few geological events which have affected the whole earth, or even a whole continent. One region may pass through a period of upheaval and mountain building while another part of the same continent may be undergoing a depression which allows the sea to cover vast areas once occupied by dry land. While volcanoes may be burying forests and fields under molten lava in one part of a continent, glacial ice may be accumulating in another region at no great distance.

Students of geology, the world over, have accepted the main subdivisions of geological time adopted by the pioneers of the science in Europe. Later study has shown that these subdivisions are not readily recognized in all parts of Europe and have but a limited application to the geological history of America. At the same time, though these divisions of geological time are, for many parts of the earth, purely artificial, probably no other dividing lines could have been chosen which would have been based on more widespread geological events. They are universally adopted because they serve the useful end of grouping life forms and

geological events for the purposes of world wide study and comparison.

The history of life on the earth is the story of the development of plants and animals from simpler to more complex forms. It is true that some ancient types still live, connecting the remote past with the present, but if we could compare the life of the earth today with that of early geological time, the differences would impress us much more strongly than would the likenesses. And yet if we could have before us a grand procession representing the life of all geological ages from the dawn of life on the earth to the present time we should be impressed by the gradual development from the earlier and more primitive forms to those of the present time. We should find no great breaks or abrupt changes marking the passage from one geological era to another—no sudden appearance of new and unexpected forms—but a gradual unfolding and up-building. This is very well illustrated by the evolution of the horse whose development from an animal not larger than a house cat to his present size occupied millions of years. But in all that time there were no abrupt changes, but rather a slow, steady progress toward the present form.

The history of life on the earth might be compared to the current of a river—unbroken from the mountain springs to the ocean. The rate of flow varies from place to place through pools and eddies in which motion is scarcely measurable, then past narrows and over rapids where it is strong and swift. So the rate of life development was at times sluggish, at times rapid, depending upon climate, food supply, density of population and other local conditions.

The division into eras is based on the broad, general features of the development of life as revealed by the study of fossils and other evidences of life contained in the rocks. The division of the eras into periods does not follow any rule. Several periods are named from the regions in which the rock systems of those periods were first studied, or most satisfactorily interpreted. The name Cambrian is from "Cambria," the Latin name for Wales. Ordovician and Silurian come from "Ordovices" and "Silures", the

names of two ancient British tribes. Devonian is from the county of Devon in southwestern England. The Carboniferous period is so named on account of the great amount of carbon (in the form of coal), contained in the rocks of that period. The Triassic is named from the threefold division of the rocks of the period in Germany. The Jura Mountains furnish us the name Jurassic. The Cretaceous is so named from the abundance of chalk (creta) in the rocks of that period, in England.

The larger subdivisions of geological time, as used in America, are shown in the table on the following page.

TOPOGRAPHY

The state is divided into three topographic zones—the eastern plains rising from an elevation of a little less than 4,000 feet along the eastern border to 6,500 feet at the mountain front; the Rocky Mountain zone the east side of which rises abruptly from 6,500 feet to the crests of the ranges where many peaks are over 14,000 feet high; and the western plateau zone extending to the Utah line.

About two-fifths of the state lies in the eastern plains zone, and the remainder is about equally divided between the mountain and plateau zones. The prominent features of the eastern zone are the shallow valleys of the Arkansas and South Platte rivers, and the broad flat divide between them.

The northern boundary of the state in this eastern zone follows closely the flat divide between the North and South Platte rivers. The head waters of the tributaries of the South Platte have cut narrow valleys into the divide.

The divide between the Arkansas and the Cimarron rivers is plateau-like and is cut into deep canyons by the tributaries of the two rivers. At the eastern border of the state the divide is about half way between the Arkansas and the New Mexico line. Farther west it approaches the New Mexico line and crosses it near the west end of Mesa de Maya.

The Rocky Mountain zone is a complex of ranges. Facing the eastern plains from north to south are: The Front Range extending from beyond the Wyoming line to Pikes Peak, and the Sangre de Cristo from the Arkansas River to

Geological Time Table.

<i>Era</i>		<i>Period</i>
Ceneozoic (New Life)	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1; text-align: center;"> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Quaternary</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Recent</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Pleistocene</div> </div> </div> </div>	
Mesozoic (Middle Life)	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1; text-align: center;"> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Tertiary</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Pliocene</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Miocene</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Oligocene</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Eocene</div> </div> </div> </div>	
Paleozoic (Old Life)	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1; text-align: center;"> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Cretaceous</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Upper Cretaceous</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Lower Cretaceous</div> </div> </div> </div>	
Pre-Cambrian	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1; text-align: center;"> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Permian</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Pennsylvanian</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>(Upper Carboniferous)</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Mississippian</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>(Lower Carboniferous)</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Devonian</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Silurian</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Ordovician</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Cambrian</div> </div> </div> </div>	
		<i>Great Interval</i>
	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1; text-align: center;"> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Proterozoic (Dawning Life)</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Keweenawan (Interval)</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Upper Huronian (Interval)</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Middle Huronian (Interval)</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Lower Huronian (Great Interval)</div> </div> </div> </div>	
	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1; text-align: center;"> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Archeozoic (Ancient or First Life)</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Keewatin</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Laurentian</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>The great Archean complex of granites, gneisses, schists, slates, quartzites, etc.</div> </div> </div> </div>	
	<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex-grow: 1; text-align: center;"> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; padding-right: 10px;"></div> <div>Archean</div> </div> </div> </div>	

the New Mexico line. The Wet Mountains are an isolated range parallel to and east of the Sangre de Cristo, extending from the Arkansas to the Huerfano.

Various local names are given to divisions of the Front Range, such as: Medicine Bow, a northern spur between the Laramie and the North Platte rivers; The Snowy range between Clear Creek and Grand counties; the Rampart Range from South Platte River to Fountain Creek; Tarry-all Mountains; Kenosha Hills, and others. The Culebra Range is that part of the Sangre de Cristo immediately north and south of the New Mexico line.

The Park Range extends from the Arkansas River in Fremont County northward through Colorado into Wyoming. Such local names as: Mosquito, Gore, and others are applied to parts of the Park Range.

Between the Front and Gore ranges are minor connecting ranges and spurs such as the Rabbit Ears, Vasquez, William's River and others. The Sawatch range on the west side of the Eagle and Arkansas valleys is one of the most massive in the system. In it are Mount Elbert and Mount Massive, the two highest peaks of the state, the Mount of the Holy Cross, and the Collegiate Group, all over 14,000 feet in height. West of the Park Range lie the Elk Head Mountains in Routt County, and west of the Sawatch are the Elk Mountains in Gunnison County.

The San Juan Mountains are a massive, rugged group in the southwest corner of the state. Many peaks are over 14,000 feet high. The Needle Mountains of the San Juan contain the most precipitous peaks in the state.

Between the Front and Park ranges are the North, Middle and South parks. The North and South parks are great level expanses ranging in elevation from 8,000 to 10,000 feet. Middle Park consists of a series of minor valleys separated by mountain ranges of considerable height.

Between the Sangre de Cristo and the San Juan Mountains lies the great level floor-like San Luis valley at an altitude of 7,000 to 8,000 feet.

The east end of the great Uinta Arch extends into the northwestern corner of Colorado from Utah.

The Plateau zone consists of a great series of mesas or plateaus flanking the mountains and declining gradually

or by step-like intervals to the western borders of the state. Their surfaces are fairly uniform. Some are horizontal, others are inclined at various angles toward the west, northwest and southwest. The valleys about their borders are usually canyons.

DRAINAGE

The continental divide forms a very irregular line lying mainly between Meridians 106° and 107° west. It parts the waters of the state, sending those of the east slope to the Gulf of Mexico by way of the Mississippi and the Rio Grande, and those of the west slope to the Gulf of California by the Colorado. The principal rivers of the east are: The North Platte, South Platte, Arkansas and Rio Grande, all of which rise in the mountains and pour their waters through steep and rugged channels to the plains, where they are fed very meagerly by the various plains tributaries, most of which are intermittent. As the precipitation in the Rocky Mountain zone is heavy the volume of water originating in the state is comparatively large.

The rivers of the west slope are: The Colorado and its tributaries: the Bear (Yampa), White, Gunnison, Dolores and San Juan, all of which head in the mountains where they receive numerous tributaries, and flow to the more arid plateau country, receiving small contributions from the intermittent streams from the plateaus.

The rainfall ranges from 40 inches per year on some of the divides to 10 inches per year in parts of the western plateau zone. The precipitation is largely confined to the six months from May to October and, as a consequence, the stream flow is subject to notable seasonal variations.

Within the mountain and plateau zones the canyon is the typical form of valley. On the eastern plains this type is not common except toward the head waters of the streams rising on the divide between the Arkansas and the Cimarron, and to a limited extent on the head waters of the North and South Platte rivers.

ROCK TYPES

There are three general rock types recognized by geologists:

1. Igneous rocks are those which have solidified from a molten condition.

2. Sedimentary rocks are those derived by processes of decay and wear of pre-existing rocks. The materials resulting from such processes are carried from their place of origin and deposited elsewhere chiefly by water and in water, though wind may carry and deposit the finer and lighter materials, such as sand and dust.

3. Metamorphic rocks are those which have been formed by the profound alteration of igneous or sedimentary rocks. The chief agencies producing such alteration are heat, water, pressure and movement.

If molten rock matter cools and solidifies very slowly it is commonly completely crystallized into mineral grains, and the texture is fairly coarse. If it cools more rapidly it may be wholly crystallized into mineral grains but they will be small and the rock is fine textured. Rapid cooling will form a rock which may be only partly crystalline and partly glassy, or wholly glassy.

The lavas poured out of volcanoes or fissures are fine textured and often glassy because of rapid cooling. Granites are coarse textured because they cooled slowly under the protecting cover of other rock masses.

GENERAL GEOLOGY

Everywhere in Colorado there is an evident relationship between geology and topography. The three topographic zones discussed are related to three geologic zones, and except for certain arbitrary limitations for convenience of discussion, they might be regarded as practically coincident. They are an eastern and a western sedimentary zone, and a central complex zone in which igneous, metamorphic and sedimentary rocks are fairly equally represented.

The eastern sedimentary zone is the great area of sedimentary rocks east of the mountains. The sharply upturned western margins of the sedimentary formations are included in the Rocky Mountain topographic zone since they present a topography more like that of the mountain zone. The boundary between the eastern sedimentary zone and the central mixed zone is an irregular line whose aver-

age position is a little west of meridian 105°, through Larimer, Boulder, Jefferson, El Paso, Fremont, Pueblo, Huerfano and Las Animas counties. To the west of this line lies the great complex of metamorphic, sedimentary and igneous rocks whose western boundary from the Wyoming line to the Gunnison River is roughly meridian 107°, 30'. From the Gunnison it sweeps westward to include the San Juan, and then southeast across La Plata and Archuleta counties to the New Mexico line east of meridian 107°. The western sedimentary zone occupies the remainder of the state. In both of the sedimentary zones there are areas of igneous and metamorphic rocks but the great preponderance of sedimentary rocks at the surface justifies the general classification of these as sedimentary rock zones.

GENERAL DESCRIPTION OF ZONES

Underlying the whole continent is a basement or floor of pre-Cambrian rocks similar in all respects to the pre-Cambrian rocks of the Colorado mountain area—granites, gneissoid granites, schists, quartzites and slates. This statement is based upon the observation that at hundreds of places these rocks are exposed. In short, wherever erosion has cut through the rocks of Paleozoic age this pre-Cambrian complex is found. In Colorado, it is the surface rock in thousands of square miles in the mountain zone, and similar areas occur in New Mexico and Wyoming. There are outcrops in the Uinta mountains; at many places along the Uncompahgre Plateau; in the Needle Mountains; on the White River Plateau, and elsewhere. In many places in the Kansas oil fields wells have been drilled through all the later formations into pre-Cambrian granites, gneisses and schists.

The plane between these ancient rocks and the overlying formations marks a very abrupt change in geologic conditions, and geologists believe that the pre-Cambrian rocks are very much older than the rocks which rest upon them. These geological differences and the evidences of great difference in age are indicated by the following facts:

Metamorphic and igneous rocks prevail in the pre-Cambrian. In the later formations sedimentary rocks are

most abundant. Igneous rocks are locally abundant, but metamorphic rocks are comparatively rare. The older the rocks the more likely they are to be metamorphosed or changed in composition and structure, since they have been longer subject to all those processes which bring about change in the materials of the earth. The older the rocks the more likely are they to become mixed and complex. Molten rocks from within the earth find their way to the surface through volcanic and other vents and mingle with the surface rocks. The older the formation the more likely it is to be cut by and mingled with igneous rocks.

Fossils and other evidences of life are extremely rare in the pre-Cambrian rocks. The few fossils found are of low or primitive forms of life. The overlying rocks are rich in fossils and other evidences of life of a more advanced type. The great gap between the life records of the pre-Cambrian and those of the later formations represents a long period of time during which life developed from fewer and lower forms to the more abundant higher forms of the Paleozoic. The record of this long period of time was certainly written in the rocks of the sea floor whether on the present continental areas or somewhere beneath the oceans.

If the seas in which this life developed covered part of the continent of America we must assume that the rocks containing that record have been removed by erosion, or, that they lie hidden by the later formations. It is a very significant fact that nowhere on the continent of North America has been found a direct uninterrupted succession of rocks from the pre-Cambrian to the Cambrian. The evidence that a long period of land conditions and erosion preceded the Cambrian is most convincing, and geologists believe that the continent had very much the present outline and size. If this is right the life record of this land period was written in areas now, as then, covered by the seas.

So long was this period of land conditions and erosion that the surface of the continent was worn down almost to a plain. There were no mountain ranges, no deep valleys, no swift rivers and no sea cliffs. Wherever this ancient continental surface may be studied it is found to have been

gently undulating, and covered with the products of rock decay.

Regular stratification is comparatively rare in the pre-Cambrian rocks. It is the rule in the overlying formations. Earth movements, volcanic activity, the work of the atmosphere and of water all tend to destroy the original layers or strata in which sedimentary rocks are laid down.

The older the rocks the less do they retain of their original forms, compositions and structures. The pre-Cambrian rocks are notably changed in these respects.

Slaty, schistose and gneissoid structures are very common in the pre-Cambrian rocks, but comparatively rare in later formations. These structures are the result of pressure, movement and changes of mineral composition and arrangement. The older the rocks the more have they been subjected to these processes of change.

Coal, oil, natural gas and other bitumens are almost unknown in the pre-Cambrian rocks. They occur in rocks of every later age, and in some abundantly.

But there can be little doubt that plant life was abundant before the Cambrian. The Grenville series of pre-Cambrian rocks of Eastern Canada contains carbon in amount comparable to that of the great coal beds of the Carboniferous. Anthracite coal of good quality is mined in the pre-Cambrian rocks of Finland, and graphite is abundant in pre-Cambrian rocks in many parts of the world. It is not unreasonable to hold that the carbon of these very ancient rocks came from plant life.

Oil and natural gas are formed from plant and animal remains. They are easily destroyed and they readily escape from the containing rock. Their absence from pre-Cambrian rock is not proof that vegetation sufficient to produce oil and gas did not exist in pre-Cambrian time.

A picture of the Colorado area of late pre-Cambrian time would be somewhat as follows: The surface would be low and undulating, the valleys broad, the rivers sluggish—carrying only the lightest sediment such as mud and sand. The rocks would be deeply weathered and decayed rock would rest on the surfaces where it formed. The outcrops of more solid rock would be comparatively few and would be much jointed and the blocks rounded into boulders

of decay. Some of our higher and flatter valleys of the mountain area present a picture quite similar to the landscape of the Colorado area in pre-Cambrian times. But there would be practically no limestone, no shale, no sandstone. Schists, gneisses, granites, would prevail, but here and there, as along Coal Creek, the Big Thompson, near Salida, along the Uinta area quartzites derived from sandstones and schists formed from shales or clay rocks would relieve the monotony of the landscape.

No grasses, trees or shrubs would clothe the land, and land animals would be absent. It is possible that along the streams a few water plants grew, but probably only in the seas would there be much evidence of life.

PRE-CAMBRIAN ERAS

In a general way the term pre-Cambrian includes all geologic time before the opening of the Paleozoic era. But as we know geologic history chiefly through the rocks exposed at the surface of the earth, the term, as commonly understood, stands for that period of the earth's history represented by outcropping rock formations which are older than the Cambrian. It is commonly divided into two great eras; the Archeozoic and the Proterozoic. The formations of the Proterozoic are commonly called Algonkian. Those of the Archeozoic era are called the Archean system or the Archean complex.

In the region of the Great Lakes the history of the pre-Cambrian is somewhat readily divisible into two eras, and the Proterozoic, at least, is divisible into periods. But in the Rocky Mountain region very few areas have given clear evidence of a natural division of the pre-Cambrian into eras, and no satisfactory sub-divisions of the eras into periods has yet been made.

For these reasons many large areas on the geological map of Colorado are called simply pre-Cambrian, and no attempt has been made to subdivide them into Archean and Algonkian. In a few regions such as the San Juan, more detailed investigation has made it doubtfully possible to separate the Archean and Algonkian areas. As a general rule, in the San Juan, the Archean includes those pre-

Cambrian rocks which have been so profoundly metamorphosed by compression, folding and mashing, that their original character has been completely destroyed. They are schists and gneisses, and what little evidence of their origin can be found points to a development from igneous rocks. The Algonkian contains some greatly altered rocks of igneous origin and some derived from sediments. In the first of these belongs the Irving greenstone; to the second, the Needle Mountains group.

The mapping of most of the pre-Cambrian geology of the state is very general and incomplete. Many areas containing distinct formations have not been divided in mapping. In others, the volume of intruded rocks, ranging in age from pre-Cambrian to Tertiary, far exceeds that of the regular pre-Cambrian formations. In many places the formations commonly regarded as Algonkian rest upon these eruptive rocks which may be of much later age. In some places, as on the slope of Arapahoe Peaks, we find typical quartzites interbedded and conforming in dip and strike with very ancient looking schists and gneisses which would ordinarily be called Archean.

A comparison of the recent map of the Georgetown area with that of the area surrounding it will show that we know very little of the detailed geology of the pre-Cambrian of Colorado. In this area it was found impossible to divide the pre-Cambrian formations into Archean and Algonkian. The oldest rocks of the quadrangle (the Idaho Springs formation), are believed to be of sedimentary origin, and vastly older than the quartzites of South Boulder Canyon, which have been classed by some geologists as Algonkian. Rocks of sedimentary origin occur elsewhere in the Archean, and it is more than probable that they occur in Colorado.

THE ARCHEOZOIC ERA

The Archeozoic era was extremely long, possibly as long as all other geologic eras combined, and the relations of land and sea must have changed many times. It is probable that the area of Colorado was many times below the sea and many times occupied by dry land during the era. Where-

ever the rivers have cut their valleys down through the later rocks Archean schists and gneisses have been exposed, and there is little reason to doubt that these rocks underlie the entire continental area and form the foundation or platform upon which the later rock systems rest. Toward the close of the era a group of islands separated by broad channels and shallow seas occupied a part of the area of the present state of Colorado, and extended northward and southward into Wyoming and New Mexico. The easternmost of the islands seems to have been several hundred miles long, and very irregular in outline. Its position was roughly that of the great eastern pre-Cambrian area shown on the geologic map. Another island lay where the Needle Mountains now stand, and a third stretched from the northwestern corner of the state far into Utah along the line of the Uinta Mountains.

The rocks of these island areas, as we find them today, consist of schists, gneisses, gneissoid granite, granite and other igneous rocks. The less altered rocks are in large part, if not all, later intrusions, and did not form a part of the Archeozoic islands. As these ancient island rocks have undergone many upheavels, tiltings, foldings and squeezings, it is safe to assume that they have been greatly altered since they stood above the Archeozoic seas. But that some of them were, even then, very much like the Archean rocks of today is shown by the fact that igneous rocks intruded into the Archean formations in early Cambrian or pre-Cambrian times contain blocks of schist and gneiss torn from the Archean formations through which they passed.

Before the close of Archeozoic time the surfaces of the islands had been cut down by erosion until they stood at no great height above the sea level, and were comparatively even.

ARCHEOZOIC LIFE

Limestone (now largely changed to marble), was probably formed as in later geologic ages, from accumulations of the lime carbonate of shells and other hard parts of invertebrate animals. Limestone is very abundant in some Archeozoic formations.

Graphite (carbon) is abundant in some Archeozoic rocks and was probably derived from plant and animal remains, as in later geologic times.

Iron Ores. Certain iron ore deposits are now being made by the aid of life forms—mainly plant—and there is good reason to believe that the iron ore of the Archeozoic rocks may have had a similar origin in part at least. Fossil algae are found in the iron-bearing rocks of Archeozoic age in the Vermilion Iron Range of Minnesota. The fact that the fossils found in Proterozoic rocks represent an advanced evolutionary development makes it probable that animal life started long before the beginning of Proterozoic time.

THE PROTEROZOIC ERA, OR ALGONKIAN TIME

At the opening of Proterozoic or Algonkian time the relations of land and sea were much the same as those of late Archeozoic time. Just how large the Algonkian land areas were it is impossible to determine, and they seem to have been mainly in what is now the mountain zone of the state.

From these Algonkian land areas the rivers carried to the Algonkian seas the sediments and spread them over the sea floor in layers or strata of conglomerate, sandstone and shale. The outcrops of known Algonkian rocks in Colorado are not large, but it is very likely that extensive areas lie buried beneath Paleozoic and later rocks.

The principal Algonkian formations to which special names have been given are the Irving greenstone and the Needle Mountains group in the San Juan, and the Uinta formation in the Uinta Mountains. On Coal, South Boulder, Big and Little Thompson, and Buckhorn creeks in the eastern foothills of the main range are considerable areas of quartzites, quartz-mica schists and mica schists which may be Algonkian. Near Salida is a thick series of rocks very similar to the Irving greenstone, and probably of the same age.

The Irving greenstone consists of massive, gneissoid and schistose basic igneous rocks, commonly called greenstones, together with a small amount of quartzite. In the Uinta formation shales and red sandstones are abundant, but

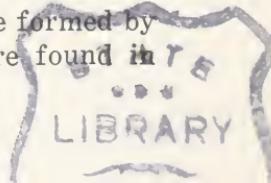
the bulk of the rock is quartzite. The Needle Mountains group consists of a conglomerate (the Vallecito) at the base, followed by a series of shales, and quartzites (the Uncompahgre).

The Uinta formation varies in character from place to place. Locally it consists almost entirely of compact, dense quartzites. In other places there are all gradations from conglomerate and quartzite to a soft sandstone. The prevailing color is reddish brown, but purple is common about the middle, and white strata are found in some places. The formation is over 10,000 feet thick, and the strata dip steeply to the north.

In many places in Colorado vast volumes of intruded and extruded igneous rocks are so related to the pre-Cambrian formations as to suggest tremendous volcanic activity in the Proterozoic era, and especially near its close. The great granite bodies of the Needle Mountains and adjacent areas are probably of late Algonkian age, and there is some reason to believe that those of the Pikes Peak area are also Algonkian. Long before the Proterozoic era closed crustal disturbances greatly increased the land areas in the Rocky Mountain region, and drove the seas back, beyond the borders of the state and probably entirely off the continent. The Algonkian rocks underwent so much folding, compression and kneading that they were, in places, completely metamorphosed before they were covered by the Upper Cambrian rocks which were the next sedimentary formations laid down within the borders of the state. The clay rocks were largely changed to schists, the sandstones to quartzites and the sandy clays to quartz-mica schists. The basic igneous rocks of the Irving greenstone formation were in part changed to schists and gneisses.

PROTEROZOIC LIFE

It is reasonable to hold that a large part of the limestones, carbonaceous shales and slates, and iron ores of the Proterozoic was formed, as in later geologic time, by the help of life processes. Very heavy limestone reefs and ledges in the Proterozoic rocks of Montana were formed by lime-secreting algae. Remains of seaweeds are found in the



the iron-bearing formation of the Vermilion Iron Range of Minnesota.

To the more obscure evidences of life may be added the convincing testimony of many identifiable fossils. Of the animal kingdom, at least six of the nine grand divisions are represented by identifiable fossils, and it is highly probable that all but the vertebrates had appeared before the end of the Proterozoic.

The Protozoa are represented by radiolaria and probably foraminifera. Several orders of siliceous sponges are found fossil. Highly organized worms lived. Bryozoans (moss-like animals) and probably brachiopods have been found fossil. Clam-like shellfish (pelecypods) represent the Mollusca. Crustaceans resembling huge lobsters occur in the Proterozoic of Montana.

Plant life was abundantly represented by algae.

Several facts help to account for the scarcity of fossils in the Proterozoic rocks of America. Life was probably not very abundant. The Proterozoic rocks are, as a rule, highly metamorphosed, and this tends to obliterate evidences of life. Most geologists believe that the Proterozoic was a time of continental sedimentation and this is unfavorable for abundant life. To these may be added the fact that in the very long period of erosion which preceded the opening of Cambrian time all the later Proterozoic rocks would be disintegrated and removed.

CAMBRIAN

Somewhere under the vast areas of later rocks on the continent of North America there may be sedimentary rocks proving that there was no time break between Proterozoic or pre-Cambrian and Cambrian. But no such place has yet been found, and all the evidence both of rocks and of fossils tells us that for a very long time before the making of the first Cambrian rocks the continent had been a land area subject to weathering and erosion, and had been reduced to a comparatively uniform surface at no great height above sea level.

Early in Cambrian time the seas invaded the continental borders and advanced slowly toward the interior, but did

not reach Colorado until nearly the close of the period, and as a consequence no Lower, Middle or early Upper Cambrian rocks are found in the state. The first invasion of Colorado by the Cambrian seas was from the northwest.

The waters of the advancing sea found the surface covered with decayed rock. As a very large part of the surface was granite the covering of broken rock, sand and clay was like that now lying on the granite areas in the mountains today.

The rivers which formerly carried the sediments to the oceans bordering the continent now dropped them in the shore waters of the invading seas. The waves of the advancing sea took the residual surface material and the sediments brought in by the streams, assorted them and spread them over the sea floor in layers or strata of conglomerate, sandstone and shale. In some parts of the sea the shore waters were clear and made a favorable habitat for animals and plants. The animals took lime from the waters, made it into their shells and other hard parts, and as the animals died these accumulated on the bottom. Century after century these accumulations grew and the waves broke and ground many of them into a mud-like mass and spread a mixture of limestone-mud shells and shell fragments over the sea floor in layers which afterward consolidated into the limestone strata of the upper part of the Cambrian formation.

Some plants, particularly certain algae, also separate lime from sea water and build limestone strata and reefs, and it is probable that they did their part in making the limestone, just as they did in Proterozoic and later times.

The Cambrian rocks of Colorado include conglomerates, sandstones, shale and limestone. In many places the sandstones have been changed to quartzite. Granitic sandstone or arkose made directly from the disintegrated granite is common at the base of the formation. Cambrian strata occur at many points along the mountain fronts, along the borders of the pre-Cambrian areas, in the San Juan, along the White River Plateau and in the Uinta Mountain area. They are rarely thick, but in the Ladore Canyon of the Uinta area they reach a thickness of 1200 feet.

The Sawatch Quartzite is the name applied to the Cam-

brian in the Sawatch Range and at many other points along the pre-Cambrian borders. It consists of pebbly quartzite or conglomerate at the base, quartzite, sometimes alternating with shales in the middle, and, clayey shales, limy shales and some limestone at the top.

The Ignacio Quartzite of the southwest is largely quartzite but in places contains some shale and limestone. The prevailing color is white to gray, but pink, red and yellow stains are common.

The Lodore of the Uinta region consists of fine to coarse sandstone and conglomerate beds in the upper part, underlain by fine, shaly and sandy strata. The colors vary from white to red, and green mottlings are common. The formation has a maximum thickness of 1200 feet.

At numerous points along the eastern slopes of the Front Range the Cambrian rocks consist of sandstones with some shale and a little limestone.

CAMBRIAN LIFE

The fauna was rather scanty but almost all the grand divisions of the invertebrates were represented and some of them had made very notable progress, showing that the previous history of animal life on earth had been very long.

Trilobites and brachiopods were by far the most important types, but sponges, worms, jelly-fish, graptolites, and stromatopora have been found fossil. It is doubtful whether corals had appeared. Fish scales have recently been found in Cambrian strata. Mollusks were fairly abundant, and were represented by clam-like forms, snail-like forms, gastropods, and possibly by forms somewhat like the squid or cuttle fish.

Certain impressions on the bedding planes of strata are believed by some geologists to be those of sea weeds, but many impressions once thought to be made by plants are now known to be worm tracks. A plant-like form, *Oldhamia*, consisting of a stem bearing clusters of radiating needles resembling pine leaves is found abundantly in the Cambrian of Ireland. In Colorado only late Cambrian rocks are known and fossils are very scarce.

ORDOVICIAN

For some time after the opening of Ordovician time the land areas continued to decrease and the seas to advance. Weathering was still preparing the surface rock for the rivers, and they continued to lower the land by carrying the decayed rock material to the sea. But much of the land surface had been worn down to such an extent that the slope to the sea was gentle and the rivers were able to carry but little coarse material. Sand was still reaching the sea along some parts of the island shores. In others the rivers brought down only mud. But in many places the shore waters were clear, marine life was rather abundant, and limestone building was in progress.

It is evident from what has been said that the rock-building of the Cambrian period was continued without interruption into the Ordovician period. The materials were still derived from pre-Cambrian rocks for the Cambrian were sinking farther and farther below the surface of the sea and were being covered by Ordovician sediments.

The Ordovician of the slopes of the Front Range is divided into the Manitou limestone, the Harding sandstone and the Fremont limestone. The Manitou follows the Cambrian without break, but after the Manitou was deposited there was an elevation of the sea floor which drained off the waters and brought the Manitou above sea level, exposing it to erosion. In places most of the Manitou was worn away before the sea again covered the area and the Harding sandstone was laid down. Such a relationship is known as an unconformity.

But before the close of the period a notable change took place. The land began to rise and the sea was pushed back until the shore lines lay outside the present outcrops of Ordovician, and possibly far beyond the borders of the state. As a result no Silurian seas are known to have existed within the area of the state, and no Silurian rocks are found in Colorado.

The Ordovician rocks followed the Cambrian, in most places without any break in deposition. But as the seas were still advancing, the Ordovician rocks in many places overlap the Cambrian and rest upon the Algonkian and

Archean. As a consequence some sections show the basal Ordovician resting on the Cambrian, as at Manitou. In others the basal Ordovician is wanting and the lowest Ordovician present rests upon pre-Cambrian rocks, as at Canon City.

The earliest Ordovician rocks, where present, are usually dolomites and limestones of varying purity, as at Manitou and Leadville. Above these the strata vary widely from place to place. While limestones were being deposited in one area, sandstones and shales were laid down in others. But, as a rule, shale is not an important rock in the Ordovician series. It may be stated as a general fact that the earliest Ordovician rocks are limestones and dolomites, and are followed by an alternation of sandstones and limestones with occasional bands and strata of shales.

The Ordovician formations have almost the same distribution in Colorado as the Cambrian, and are found on the borders of the pre-Cambrian areas.

Though there are many outcrops of Ordovician rocks the formations are named at only a few places, as follows: Manitou limestone, Harding sandstone and Fremont limestone, along the eastern foothills of the Front Range; the White limestone and Parting quartzite at Leadville, Aspen and many neighboring points; the Yule limestone in Gunnison County; the Ogden quartzite in the Uinta Mountains.

The names of the formations suggest their character in all these instances, and descriptions are unnecessary. The Harding sandstone of Canon City and an equivalent formation in Gunnison County contain fossil fish remains, for a long time the oldest known evidences of fish. But recently somewhat similar fossils have been reported from the Cambrian.

The Yule limestone on Yule Creek has been metamorphosed into a large deposit of beautiful marble. The White limestone is related to some of the Leadville ore deposits.

ORDOVICIAN LIFE

The Ordovician was an extremely long period and evolutionary progress was very great. At the end of the Ordovician all the great divisions of the marine invertebrates

and most of their important subdivisions had appeared. Migration had brought into American seas types far in advance of the latest Cambrian forms yet found. This seems to prove that development had taken place in some region not yet known.

The graptolites, the straight shelled cephalopods, the trilobites and some of the echinoderms reached their time of greatest development and began to decline. Important groups include the sponges, pelecypods, crinoids, trilobites, brachiopods and corals. Primitive fishes, the ostracoderms (shell-skin) lived in the seas of Colorado and Wyoming. Fossils have been found at Canon City and near Gunnison. They were probably the direct descendants of the types whose scales have recently been found in the Cambrian.

Land plants were probably well developed, but since the known Ordovician rocks are mainly marine, no records have been found. Sea weeds and algae resembling corals in form are known in America. Cryptogams are reported from Europe. These are spore-bearing plants such as ferns, mosses, fungi, algae and liverworts.

SILURIAN

The seas retreated from what is now the mountain region in late Ordovician time and there is no evidence of a return to the Colorado area until late in Devonian time. Colorado and much surrounding territory was a land area during late Ordovician, all of Silurian and the greater part of Devonian times. The same inorganic agencies of change were at work upon the rocks as are now breaking down the rocks and preparing them for removal to the ocean basins. The rivers did their work as now—carving valleys, carrying landwaste to the sea and draining the land surface.

But there was a notable difference in the appearance of the region. There were no great mountain ranges, deep valleys or canyons. It is likely that land plants occupied the low lands along the rivers and shores, but vegetation was by no means general. Forest trees or large woody plants had not yet evolved. Animal life on the land was very scarce. The first insects are believed to have appeared in late Ordovician.

SILURIAN LIFE

The history of life in the Silurian followed the lines already established in the Ordovician. Some forms reached their highest development and began to decline. Others continued to advance and new types appeared. Considered in the large, there was decided progress, but the period was much shorter than the Ordovician, the continental seas were very limited, and at times only the bordering seas remained to supply favorable life conditions.

Sponges were still abundant, corals and crinoids made great progress, but trilobites declined. The brachiopods were the dominant form of life in the seas. Eurypterids increased in size and numbers but did not reach their greatest development in either respect. Though the brachiopods more than held their own, it was largely by the rapid appearance of new forms, for many Ordovician species disappeared. The fishes were smaller but they made considerable progress in development toward the Devonian forms, of which they were the ancestors. Sharks of primitive types appeared.

Little can be said of the development of plant life. A few doubtful impressions have been found, and a few fern fossils occur in the Silurian of France.

DEVONIAN

No early Devonian rocks have been found in Colorado, and therefore we have no direct evidence that any part of the state was covered by the sea during early Devonian time. Just when this period of growth of the Rocky Mountain land area ceased and the seas began again to invade the land, we do not know. But it was not until past middle Devonian time that the sea advancing from the west reached the line which marks the western border of the Front Range. How far the sea advanced from the east in Devonian time we have no means of determining for there is no outcrop of Devonian rocks east of the mountains. But we do know that soon after the close of Devonian time the sea entered certain bays along what is now the eastern base of the mountains.

In Colorado, therefore, we have only late or upper Devonian rocks, and these only west of the Front Range. If,

as some geologists believe, the Parting Quartzite is Devonian, the oldest Devonian rocks exposed in Colorado were laid down as sandstones on the floor of the Devonian sea. This formation or its equivalent, seems to be rather widespread in the central zone of the state.

The Devonian seas appear to have entered Colorado from the southwest and advanced across the San Juan region toward the north and northeast. Devonian strata occur in the San Juan, at Salida, at Glenwood Springs, along the White River Plateau and elsewhere.

The Elbert formation consists largely of limestones alternating with thin bands of calcareous shales, clay shales and sandstones. In a few places the shales almost equal the limestone in volume, but sandstones are rarely or never abundant. Resting conformably upon the Elbert is the Ouray formation consisting of limestones, with shaly partings and some shaly and sandy layers. The lower two-thirds of the Ouray is upper Devonian, but the upper one-third is of Mississippian age.

The Elbert contains an abundance of invertebrate fossils, and a few fish remains somewhat similar to those of the Ordovician near Canon City. The equivalent of the Elbert is not widely distributed, and it would appear that the Elbert sea did not extend much beyond the San Juan, whereas the later, or Ouray phase, reached the White River area and possibly farther. So far as yet discovered the Ouray sea did not reach Leadville until after the close of the Devonian and the Leadville or Ouray of Leadville contains only the Mississippian fauna.

The strata of the Ouray formation are apparently conformable throughout, yet the basal part of the formation contains an Upper Devonian fauna and the upper part an entirely distinct lower Mississippian fauna. Between the two faunas are strata without fossils, and in certain localities there is a rather abrupt change in the character of the sediments, but this change is in the barren beds between the two faunas. This may mark the dividing plane between the Devonian part of the formation and the Mississippian, but there is no other evidence of a disconformity or a break in sedimentation. There is, however, a complete break in the life history as recorded in the Ouray formation. The

two faunas are absolutely distinct. Not a single Devonian species lived on into the Mississippian.

We may attempt to account for this by assuming that the Devonian fauna migrated from the area and left the late Devonian waters uninhabited; or that the Devonian fauna died out; or that the sea floor rose and the area became land. But land conditions could have existed only a short time for there is little or no evidence of erosion. The Devonian part of the Ouray consists of limestones with thin separating shales or marls. In some places the limestone is sandy.

DEVONIAN LIFE

The Devonian marks a very great forward stride in several lines of life development, but the progress was not general.

The trilobites, the rulers of the Cambrian seas, were but a very subordinate feature of Devonian marine life. They tried to make up for their deficiency in numbers by the development of fantastic forms and rich ornamentation. The brachiopods reached their climax. Corals were extremely abundant, and built many reefs. The abundance, size and variety of fishes justify the name "Age of fishes" for the Devonian. Over 100 species and more than 40 genera of fresh water fishes are known. Marine forms were only less numerous than their land-water relatives. Amphibians were probably present, but as yet little fossil evidence has been found.

A varied, rich and luxuriant vegetation existed and fossils of all the higher cryptogams are found. Many of them were represented by large tree-like forms, and the first forests appear. Ferns, clubmosses and horsetails were represented by very large species such as the lepidodendrids which reached tree proportions. Logs of primitive evergreens are found fossil in late Devonian strata. These plants were probably more like seed-bearing ferns than like the conifers of today. The connecting links between the flowering and non-flowering plants, known as the cycadofilices—(sycad-ferns), appeared in the Devonian.

Primitive flowering plants having unisexual flowers

without perianth or true flower leaves are found fossil. The Devonian flora was the direct ancestor of the still more abundant flora of the Pennsylvanian.

MISSISSIPPIAN

The break in the life story as recorded in the Ouray formation is best interpreted by assuming that there was a rather sudden retreat of the sea in late Devonian time, followed by an equally sudden return in early Mississippian time. The land period between the two was so short that no evidence of erosion between the strata of the two periods has been found.

This return of the sea marks the beginning of a very widespread subsidence of the land, and it is probable that the entire area of the state was covered by the early Mississippian seas. Early Mississippian strata are much more widespread than the Devonian. The land was slowly sinking and the seas advanced upon the land. The rivers brought in the products of land waste and the waves spread them over the sea floor covering the Devonian strata and overlapping onto whatever formations made up the subsiding land surface. As a result, we find Mississippian rocks resting upon Devonian, Ordovician, Cambrian and pre-Cambrian. How long this subsidence of the land and advance of the seas continued we do not know, but the evidence suggests that crustal warping began at the close of Madison time and opened a period of elevation or up-heaval, in which the shallow bordering sea waters were drained off to the deeper sea basins and the eastern shore line of the great western sea pushed back, possibly to or beyond the western border of the state. To the south, in New Mexico the Mississippian sea became the Pennsylvanian sea and Mississippian strata are followed without break by Pennsylvanian strata.

Only the lower part of the Mississippian is present in Colorado, but the strata are very widespread, and there is reason to believe that the Mississippian seas covered practically the entire state. The formation has received several local names. In the San Juan and elsewhere the name Ouray is in common use, but only the upper part of the

Ouray is of Mississippian age. In several mining districts, such as Leadville, Tenmile, Aspen, Crested Butte, Alma, Red Cliff, Monarch and Tomichi and Gold Brick, it is called the Leadville or Blue limestone or occasionally the Ouray. It is known in the valleys of the Eagle, the Grand, the Dolores and the White rivers, and in the Sangre de Cristo, the Uinta, the Elk and the Front Ranges. East of the Front Range it is called the Millsap. It is called the Wasatch in the Uinta and Wasatch ranges.

The equivalent formation is widespread in Wyoming, Montana and elsewhere in the north and is known as the Madison. As this is the most widely and consistently used name it should be adopted for general use, though it can never displace the local names.

The Mississippian part of the Ouray at Ouray consists of 70 feet of light bluish-gray to nearly white limestone. The Leadville or Blue at Leadville is a deep grayish-blue heavily bedded series of dolomitic limestones, in the upper part often coarsely crystalline, having an average thickness of 200 feet. This description applies to the formation in many places. The Millsap is mainly limestone but its color varies from gray to purple, buff, red and brown, owing to different conditions of deposition and subsequent history.

In northwestern Colorado the Madison consists of gray cherty limestone with a little gray sandstone near the base, and reddish sandy material at the base. It rests unconformably on older formations which may include pre-Cambrian. It is not exposed along the foothills in northeastern Colorado, but in the basal part of the Fountain typical Mississippian fossils and blocks of chert containing Mississippian fossils from parts of a pebbly conglomerate.

In the San Juan the Molas formation of Pennsylvanian age contains many chert blocks carrying Mississippian fossils like those of the Ouray, on which the Molas rests, but the Matrix of red marl or calcareous mud is clearly of Pennsylvanian age.

MISSISSIPPAN LIFE

The Mississippian life is, in many respects, an orderly continuation of the life movements of Devonian time. The

trilobites were represented by a few highly onamented genera. The crinoids reached a wonderful climax both in numbers and beauty rather early in Mississippian time, and in a small area near Burlington, Iowa, 400 fossil species have been found in the Burlington limestone which is composed very largely of fragments of crinoids. They declined greatly even before the close of Mississippian time.

Reef-building corals seem to have deserted the American seas, in spite of what appear to have been favorable conditions. Neither crinoids nor corals were abundant in the western Mississippian faunas. Brachiopods and bryozoans were abundant in all the Mississippian seas. The nautiloid cephalopods were gradually giving place to the ammonoid type. Fresh-water fishes had reached their greatest development and had notably declined, but marine fishes and especially the sharks advanced to easy supremacy. Over 400 species of Mississippian sharks are known, and the shell-feeding, pavement toothed forms were dominant. Amphibians, the first air-breathing vertebrates were fairly numerous in Europe, but less so in America. They became very numerous in Pennsylvanian time.

The Mississippian land plants were intermediate between those of the Devonian and those of the Pennsylvanian.

PENNSYLVANIAN

Long before the end of Mississippian time a general rise of the Colorado area began and the seas were drained back beyond the border of the state (except possibly in the Uinta Mountain section), and Colorado became an island or peninsula, for marine conditions continued both to the north and to the south.

Weathering disintegrated the rock surfaces and prepared materials for the streams to carry to the sea. Before the return of the seas at the opening of Pennsylvanian time what had been the Mississippian sea floor—a monotonously uniform plain—was carved into hills and valleys, and presented a topography much like that of the eastern plains of the state.

Then followed a period of subsidence. The seas slowly

crept over the land, and the waves assorted the materials they found on the surface, carrying the finer sands and clays into deeper water to make sandstone and shale, and leaving the coarse as a conglomerate to form a base for the new strata to be built out of the sediments carried in from the land by the rivers. These new conditions mark the opening of the Pennsylvanian period. In many places the Pennsylvanian strata covered the edges of all earlier Paleozoic rocks and extended out upon the pre-Cambrian formations. In fact, there is such a wide distribution of Pennsylvanian rocks that very little of the state could have stood above sea level.

In the western part of the state the Pennsylvanian opened as a truly marine period and locally it continued so to the end. In other places the true marine conditions lasted but a short time and were succeeded by continental conditions under which the sediments were deposited in continental basins often wholly cut off from the sea, and along river courses and flood plains and in fresh water basins rarely of long life.

The continental deposits are characterized by great irregularity of bedding, the prevalence of cross-bedding, the sudden variations in texture and character, as from coarse to fine, from clay to sand and limestone. Fossils are rarely abundant. For this reason, and because of their discontinuity, and variable character they are hard to trace from place to place.

Such deposits are commonly red, brownish red and brown owing to the abundance of the red oxide of iron, and the scarcity of organic matter which would tend to reduce the oxides and give the normal dark color to shales and the gray to white color in sandstones.

The vast bodies of red sandstone, arkose, conglomerate and shale, and some limestone composing the widespread Maroon formation, the Weber grits and other formations are of this continental type. The Hermosa is more typically marine, as is also its equivalent in the Sangre de Cristo Range.

East of the range the Pennsylvanian was mainly a period of continental deposition, but marine conditions occurred several times and in many places. The forma-

tions, Glen Eyrie, Fountain and Lyons, though containing fossil evidence of their age are notably lacking in remains of the abundant life which characterized the period as shown by the richly fossiliferous Hermosa formation in the San Juan, and the equivalent of the Hermosa on the eastern slopes of the Sangre de Cristo Range.

The Hermosa is widespread in southwestern Colorado and may be regarded as the typical marine Pennsylvanian.

It is a complex of limestones, sandstones and shales. The limestones are rather dense blue-gray, fossiliferous and locally highly bituminous, and range in color from black to gray and greenish. The sandstones are commonly greenish, and both they and the shales are more or less calcareous. At Rico the limestones occur in the middle of the formation, but in many places the strata change greatly from place to place and are not easily traceable or identifiable.

The Fountain (Lower Wyoming) east of the range may be regarded as representing the continental phase of the Pennsylvanian. It is even more heterogeneous than the Hermosa. Sandstones and arkose of various shades of red and gray, pebbly red conglomerates, red sandy shales and lenticular bodies of limestone rarely of great extent make up strata ranging from 800 to 1200 feet in thickness. None of the beds are persistent, and changes of composition, color and texture are very frequent.

At the top of the Fountain is a persistent sandstone member laid down in shore waters. It is cross-bedded, thinly laminated and decidedly quartzitic. It varies slightly in color but is generally pink. This is the Lyons.

The Mississippian seas appear to have remained longer in northwestern Colorado, and some geologists think the Pennsylvanian strata lie conformably on the Mississippian, as in New Mexico.

In the Uinta area the Pennsylvanian rocks consist of gray limestone, gray and red sandstone, gray shale and coal, having a total thickness of over 500 feet. These are followed conformably by the Weber quartzite, a fine-grained cross-bedded quartzitic sandstone 900 feet thick. The Weber is probably equivalent to the Lyons or Ingleside east of the range.

The Park City formation follows the Weber quartzite, but whether conformably or unconformably is a matter still in dispute. The evidence seems to point to an obscure unconformity of considerable importance. The formation in Colorado consists of 115 feet of limestone, shale, chert, sandstone and phosphatic shales. This formation contains the rich lead-silver ores of Park City, Utah; rich phosphate rock and oil elsewhere.

The fauna of the Park City has an individuality which makes it difficult to fix the age of the formation, but it is probably Pennsylvanian. The upper part of the formation may be Permian.

The Pennsylvanian was the great coal-making period of the eastern part of the continent, but in the west the geological conditions were not favorable, and there is no workable coal of this age in Colorado.

PENNSYLVANIAN LIFE

The three Carboniferous marine faunas are clearly a succession but the advancement of the Pennsylvanian over the Mississippian is much greater than is that of the Permian over the Pennsylvanian.

One type of foraminifera, the Fusulina, was so abundant as to form large bodies of limestone in both Pennsylvania and Permian times. Corals were represented by the simple cup forms but were not abundant. Crinoids had fallen to a very subordinate place. The Brachiopods of early Pennsylvanian were the most abundant shelled animals in the seas but they declined rapidly in later Pennsylvanian time. Spined and thick, strongly-marked Brachiopods were the most numerous. Pelecypods (clam forms) gained rapidly, but Cephalopods outran all other mollusca. Trilobites were scarce, but other crustaceans increased. The Eurypterids, a prominent group of Silurian time, still lived.

Insects were very numerous. To the forms of Mississippian time were added bugs, beetles and dragon flies. A dragon fly fossil having a wing spread of 30 inches has been found. Amphibians were represented by nearly 50 genera. The stegocephalians with heavy, platy head cover-

ings were the most striking land animals. Reptiles of primitive types are found fossil.

The plant life of the Pennsylvanian was very abundant and tree forms were dominant. The club mosses or lycopods of which the *Lepidodendron* and the *Sigillaria* are the best known forms, grew to heights of sixty to one hundred feet and stem-diameters of two to six feet. They were the great coal-makers. *Sphenophylales* were slender, probably climbing plants.

Equisetae—horsetails—had slender stems divided by transverse joints. The stems contained a pith column surrounded by a woody structure. The leaves were variously arranged in star-like radiations and in connected rings. Present day *equisetae* rarely exceed two feet in height. But some of the Pennsylvanian forms reached a height of sixty to ninety feet. True ferns of both tree and herbaceous varieties were abundant. Many present day types were represented in the Pennsylvanian forests.

Gymnosperms (naked-seeded plants) were represented by cycad-ferns and cordaites. The cycadferns are a connecting link between the flowerless ferns and the flowering cycads. They resemble tree ferns. The cordaites were the only flowering plants, and these had no brightly colored flower leaves. They were very tall, slender trees, having on their tops dense crowns of branches bearing large, simple leaves with straight parallel veining like those of the lilies and grasses. The cordaites were related to the cycads, the conifers, and the ginkgos, but did not belong to any one of these groups.

The forests were dense, gloomy and monotonous—unrelieved by a great variety of plants, or by bright flowers. This flora was very widespread.

RED BEDS

The earlier geologists of the Rocky Mountain region gave the name Red Beds to the great series of highly colored sediments upturned against the pre-Cambrian granite-gneiss-schist series east of the mountains, and later to similar rocks beyond the range. In Colorado the Red Beds east of the range include practically all the Pennsylvanian, all

the Permian and the Triassic, if any Triassic exists east of the range in Colorado.

West of the range, the Red Beds include the continental Pennsylvanian, (Maroon in large part, Weber grits), the Permian (Rico and Cutler), and the Triassic (Dolores).

PERMIAN

The Permian may be said to have brought to a climax conditions which began in Pennsylvanian time, not only in the Rocky Mountains area but throughout the continent. Widespread continental seas gave place to dry land. The abundant rainfall of the early Pennsylvanian was succeeded by Permian aridity, greatly reduced land waters and scarcity of food. Rock decay was largely mechanical and plant food likewise became scarce.

Permian sedimentation was widespread. Probably all Eastern Colorado is underlain by Permian strata. West of the range rocks believed to be of Permian age are almost as widespread as are those of the Pennsylvanian.

The conditions of life were very hard for both plants and animals, and fossils are remarkably scarce in Permian strata. The red color, the coarse texture, the predominance of sandstones, conglomerates and grits, the scarcity of limestone, and the irregularity of deposition and arrangement of the rock materials all point to climatic conditions such as those of the deserts and semi-arid regions of today.

In eastern Colorado the semi-continental conditions which characterized the Pennsylvanian continued into Permian time and the conformable Lykins was laid down. The formation consists of red, brown and chocolate sandstones, shales and sandy shales which are locally calcareous and in a few places contain limestone lenses. Cross-bedding and flow-and-plunge structure are very common. Abrupt changes in character of the material, the texture and color are very numerous.

West of the range there is generally and probably always a well-defined break between the Pennsylvanian and the Permian strata. In the San Juan there is a pronounced unconformity between the Hermosa of marine deposition and the Rico of mixed continental and marine origin.

The Rico is followed by the Cutler, a series of sandstones, grits, conglomerates, shale and limestone. Grits and conglomerates make up about one-third of the total thickness. Gradations from one lithological type to another are very frequent and uniformity of material or of stratification is very rare. Cross-bedding is almost universal. All strata are calcareous and gradations from calcareous sandstones to limy shales and clayey and sandy limestones occur. Pure clays and pure limestones are rare. Gypsum in thin beds occurs in some areas. Red of various shades is the prevailing color, but greenish and grayish tints and even white blotches, streaks and patches give variety to the coloring.

No fossils have been found and the assignment of the Cutler to the Permian is based on stratigraphic relations and lithological resemblances.

PERMIAN LIFE

The life of the early Permian is so much like that of the Pennsylvanian that it is hard to fix the boundary line between the two. But early in Permian time the rising land shut out the continental seas, evaporation became less, and rainfall decreased. Land barriers changed the oceanic circulation and affected the atmospheric circulation. These conditions caused a great reduction of shallow water areas suitable for marine life, reduced the land waters, reduced the food supply, and changed much of the earth's surface into arid and semi-arid wastes.

The stress of life conditions was further increased by the most widespread glaciation known in the history of the earth. The struggle for existence was most severe. All forms of life were greatly reduced, many forms disappeared. By the end of Lower Permian time the entire continent was above sea level, and it remained a land mass until the opening of Triassic time. These hard conditions are portrayed in the prevalence of red rocks with their very scanty content of life remains, their large deposits of gypsum and rock salt and the scarcity of limestone, coal and oil.

A comparison of the known animal species of the Pennsylvanian and Permian periods made a few years ago

showed 10,000 for the Pennsylvanian and only 350 for the Permian. Recent study has probably lessened the disparity, but there is not even an approach to equality.

Marine invertebrates did not suffer very severely in the early part of the period, and corals and cephalopods gained ground both in numbers and in newer and more modern forms. Crinoids became scarce, and trilobites became extinct. Several important brachiopod types declined notably—some of them almost to extinction. Pelecypods were the dominant invertebrates of the Great Plains region. New types of fishes appeared, but the old were still dominant. The amphibians evolved some new genera, especially smaller forms. The reptiles were the most important vertebrates. Several orders and many species of great size have been found fossil, especially in New Mexico, Oklahoma and Texas. Insects became smaller and more modern in type.

The early Permian plant life was but a lightly modified Pennsylvanian flora, but the unfavorable geological, geographical and climatic conditions caused great changes before the end of the period. Of the important Pennsylvanian types the lepidodendrons, the sigillaria and the calamites died out. Ferns advanced notably. The Gymnosperms (naked-seeded plants) advanced rapidly, and included cordaites, cycads, ginkgos and conifers. The most conspicuous floral change was the appearance of the *glossopteris* (tongue fern) flora which evolved in the area of Permian glaciation and spread very widely.

MESOZOIC ERA

TRIASSIC

East of the range there is but little satisfactory evidence of the existence of Triassic strata, though a pinkish gray sandstone lying on the Permian near the Wyoming line and a similar sandstone in the same relationship in the southeastern part of the state may be Triassic. In Northwestern Colorado the Permian is overlain by a dark red ripple-marked and rain-printed shale, above which are sandy strata followed by shale and limestone containing Triassic fossils. Two hundred feet of red and gray sandy shale,

sandstone and grit resting on the limestone may also be Triassic.

In the southwest the Dolores, Triassic, is unconformably on the Cutler, and consists of sandstones, shales and fine grained conglomerate, all more or less calcareous. In the lower part is a conglomerate composed largely of small limestone pebbles. The upper part is fine even-grained red sandstone and shale, with a strong cliff-making gray to pink sandstone at the top. The "bone conglomerate" or "saurian conglomerate", a very interesting part of the formation, contains many teeth of crocodiles and saurians and many bones and bone fragments. Along the White River Plateau Triassic rocks occupy considerable areas and a "bone conglomerate" fixes their age beyond doubt.

The Cutler and Dolores formations by their great variety of material, their varying degrees of resistance to erosion, their brilliant and yet varied coloring have made possible the development of one of the scenic fairy-lands in this country. Steep walled canyons of brilliant but always harmonious coloring, benches and shelves, spires and turrets, glens and caverns, tree-crowned cliffs and grassy basins abound in a startlingly beautiful though but little known part of Southwestern Colorado.

The Triassic closed with a widespread elevation of the land in the Rocky Mountain region and while sedimentation may have continued uninterruptedly from Triassic to Jurassic in limited areas, the general relations of the Jurassic to the Triassic rocks are unconformable. Before the close of the Triassic time life conditions began to improve and the greatly impoverished fauna and flora showed many signs of revival. The opening of the Jurassic continued and hastened the progress of recovery and there began in America the most notable period of expansional evolution known in geological time.

MESOZOIC LIFE

TRIASSIC

The distressing conditions of Permian time continued into early Triassic, and the lower Triassic formations con-

tain very few fossils. Soon after the middle of Triassic time conditions improved, but it was not until early Jurassic time that there was a complete return to normal climate and environment.

The strenuous conditions through which life had passed seem to have preserved, developed and strengthened those functions, habits structures and features best fitted to cope with the hard times. When conditions improved many new types appeared, and the less favored or less progressive older forms dropped out of the race.

Amphibians dropped from first place and entered upon a decline from which they never recovered. The reptiles evolved rapidly especially toward the close of the period, when the climate improved. They included crocodiles, both marine and terrestrial, flying saurians (related to the lizard), true lizards, and snakes. The dinosaurs were the dominant types. In some respects the saurians foretold the advent of birds. Marine saurians appeared as the seas of late Triassic time invaded the land, and 40 genera and 92 species of land reptiles have been found fossil in the Connecticut valley alone.

Small, primitive types of mammals, possibly related to the pouched mammals or marsupials, came in but no placental mammals had yet appeared.

Of the marine invertebrates, the brachiopods, trilobites, crinoids and corals of the Paleozoic were all forced into the background, and in their places two molluscan forms, the ammonites (coiled cephalopods) and the pelecypods take first and second places. The ammonites were represented by 1,000 species. Brachiopods were never again very abundant, but new forms with long hinge lines and prominent beaks appeared.

Conspicuous among new invertebrate forms were the cuttlefish, new species of gastropods and new pelecypods. Some of the pelecypods were very modern in appearance and a few were identical with living types.

The crinoids gave place to the sea urchins. Corals flourished in favored places and the compound species were of the modern type.

The dominant plant life included ferns, horsetails, cycads and conifers, and the coals of Virginia, North Car-

olina, the Keuper coal of Germany and Sweden, and the Triassic coal of South Africa and Australia are formed from accumulations of these plants. Cycads were very numerous, and the Mesozoic is sometimes called the "Age of Cycads." Conifers in dense forests occupied the hills and uplands. They resembled the Araucarians of South America, Polynesia, and Australia. Cypress-like trees, the Voltzia, were also common.

The forests were still gloomy and monotonous. No bright flowers, and very little variety of foliage relieved the sameness of the vegetation. The present day fern forests of New Zealand may give some idea of the appearance of the Permian forests.

JURASSIC

Land conditions prevailed over the greater part of the North American continent through Lower and Middle Jurassic time. In Upper Jurassic time the seas again invaded the continent, but it was not until at least the middle of Upper Jurassic that they reached the Rocky Mountain region, and their stay was but short. In them were laid down formations of almost equivalent age known as the Sundance, the La Plata, the Nugget (in part at least), and the Twin Creek.

The Sundance occurs east of the range in Colorado as thin upturned strata of creamy white to buff sandstone in unconformable contact with the Lykins, from the Wyoming line southward to the Cache la Poudre. West of the range it occurs in the vicinity of Hahns Peak and along the White River Plateau, where it consists of light to dark gray limestones, sandstones and shales. Fossils are abundant in the Hahns Peak area.

In northwestern Colorado the Nugget formation consists of fine grained, cross-bedded, poorly cemented white to buff sandstones with some red and gray shale near the top. The Twin Creek is a light gray fossiliferous limestone with some marine shales at the base.

It has been suggested that the La Plata of southwestern Colorado was deposited by wind in the form of dunes, and later worked over, in part at least, by fresh water. The

absence of animal fossils, the uniformity of texture and the structural features of the formation are not out of harmony with this suggestion. But its very wide distribution and the fairly constant division into an upper and a lower heavy sandstone, and an intermediate thin bedded and limy division are hard to account for under conditions of wind deposition.

In the Gunnison area the equivalence of the La Plata and the McElmo were formerly called the Gunnison.

After the retreat of the Jurassic seas fresh-water basins occupied large areas in the Cordilleran zone and in parts of the Pacific northwest. In these basins were laid down vari-colored marly shales, limestones and sandstone. These lake basins were surrounded by low-lying plains rich in vegetation and inhabited by great dinosaurs, and primitive mammals, the bones of which are found in considerable numbers in the lake beds, along with the shells of fresh water mollusks and fossil plants.

These beds are known as the Morrison east of the range, and they outcrop interruptedly along the flanks of the range from the Wyoming line to New Mexico and they probably underlie much of eastern Colorado as erosion has exposed them in numerous places. In western and southwestern Colorado they are called the McElmo and are exposed in many of the larger valleys and along the Uncompahgre Plateau and the slopes of the La Sal Mountains.

JURASSIC LIFE

The improvement in life conditions which began in late Triassic time continued increasingly through Jurassic. The climate was genial and without seasonal stresses, rainfall increased and food became abundant on the land, in the shallow shore waters, and in the invading seas which were gradually making their way over the continents. In North America the transgression of the seas made little headway until the latter half of the period, and then only in the west.

The Jurassic inherited from the Permian and Triassic meager but well seasoned, tried and proved faunas and floras—children of adversity—needing only the magic of

suitable environment to cause them to multiply, replenish and repossess the earth.

It is impossible to give in short space more than the most sketchy picture of the marvelous evolutionary progress of the Jurassic.

Reptiles take first place in both sea and land faunas, and of the reptiles the dinosaurs were easily supreme. Turtles, crocodiles, lizards and others of the 18 Mesozoic reptilian orders played their part in the life drama, but for the leading role the dinosaurs had no rival. They ranged in length from a foot to 80 feet, in height from a few inches to 20 feet, and in weight from 10 pounds to 40 tons. By structure and adaptation to environment they ruled sea, land and air. There were herbivorous and carnivorous forms, some walked or ran on four legs, others were equally swift on two. Some swam the seas and the lakes and wallowed in the marshes. Others equalled the birds in flight, using membranous wings like those of the bat. Some were unprotected by armor, but others carried head and neck armor, and still others body plates of great weight.

Turtles were inconspicuous, but fossil remains are found in the Morrison formation. The crocodiles were numerous in both marine and fresh waters. Little is known about Jurassic lizards but they certainly existed.

The Morrison and McElmo formations are fresh water Jurassic sediments, and the Morrison of Colorado and Wyoming has yielded a very rich harvest of Jurassic fossils. These include 69 kinds of dinosaurs, 25 primitive mammals, one bird, one pterodactyl, one turtle, 3 crocodiles, 3 fishes, 24 invertebrates, 23 plants, and a frog.

The only mammalian fossils of Jurassic age yet found are those of very small primitive forms, probably of the pouched insectivorous type. Jurassic birds had many reptilian features but were clothed with feathers, and were highly developed. The fishes began to assume a somewhat modern aspect. Skates and rays were numerous. Sea-cats (spook-fish) appeared. The ancestors of the garpike and the sturgeon were most numerous, and the ancestors of the teleosts (bony-fishes) appeared. The descendants of the Triassic land reptiles, such as the ichthyosaurs and the plesiosaurs became very abundant in the seas, and

might be called Jurassic sea serpents. Insect life was represented by several of the orders.

The invertebrate marine fauna was very abundant. Corals and crinoids showed a distinct revival in late Jurassic time, but no Paleozoic crinoids remained. Crabs, lobsters and prawns represented the crustaceous, and presented modern features. Pelecypods of modern appearance were very numerous. Oysters were abundant. The ammonites were the dominant invertebrates, and were represented by both advanced and decadent forms. The latter were prophetic of the disappearance of the group in the Cretaceous. Belemnites—cephalopods with internal shells and two gills—were very numerous. The Sundance formation in Routt County is very rich in belemnite fossils. Sponges were very abundant, and foraminifera and radiolaria were widely distributed.

The Jurassic flora is a continuation of that of Triassic time, and consists of ferns, horsetails, cycads, conifers, and ginkgos. Of these the conifers showed the greatest advance toward modern types, and included yews, cypresses, cedars and pines, though not of species now living.

In Europe many land plants were buried in marine sediments along the Jurassic seacoasts.

CRETACEOUS

The close of the Jurassic was a time of great land emergence and the continent was probably larger than it is now. In early Lower Cretaceous time a sea covered part of eastern Mexico and from this area it invaded the United States, but it did not reach Colorado until late in Lower Cretaceous time and only the latest of the three divisions of Lower Cretaceous (the Washita), is present in the state. This invading sea gradually extended northward over what is now the mountain zone until in early Upper Cretaceous time it joined a great southward advancing arm of the Arctic Ocean and with it formed a continuous mediterranean sea the length of the continent. In the Colorado part of this sea in the area east of the present mountains were laid down in conformable succession the "Dakota", the Benton, the Niobrara, the Pierre, the Fox



OIL SHALE CLIFFS IN THE DE BEQUE, COLORADO AREA

Hills, and the Laramie formations, making in places a total thickness of Cretaceous sediments, mainly shale, of 10,000 feet or over.

The Benton and Niobrara form the Colorado group; and the Pierre and Fox Hills are the Montana group. West of the range a similar conformable series consists of the Post-McElmo, "Dakota," Mancos, Mesaverde, Lewis, and Laramie.

The Dakota consists of two sandstone members separated by a body of shale. The lower sandstone and the shale are marine beds of Lower Cretaceous age, and the upper sandstone is of fresh water origin, and Upper Cretaceous age.

The Lower Cretaceous division is called the Purgatoire. In the Colorado Springs area the members of the Purgatoire are called the Lytle sandstone and the Glencairn shale. Farther north they are called the Lakota sandstone and the Fuson shale. The pebbly conglomerate at the base of the Purgatoire is one of the most persistent and easily recognized beds in the Rocky Mountain region. West of the range the Post-McElmo and the lower members of the "Dakota" contain a Lower Cretaceous flora and must be considered as the near equivalent of the Purgatoire.

The Upper Cretaceous part of the "Dakota" both east and west of the range is a strong sandstone. In the east there is an abrupt change to the overlying Benton shale, whereas in the west there is a coal-bearing transitional group between the sandstone and the typical Mancos. These coal-bearing beds have also been classed as Mancos, but usage seems to favor their assignment to the Dakota.

Both sandstones of the "Dakota" yield artesian water in eastern Colorado and both are oil-bearing in Wyoming and possibly in the northern Colorado fields. The opening of the Benton marks the change from fresh water to marine conditions which continued until nearly the close of Cretaceous time. The strata consists of 200 to 400 feet of dark gray to blue-gray shales with thin sandstones and limy layers, the Graneros, followed by 25 to 150 feet of limestone, the Greenhorn, and a varying thickness of dark gray shales with thin sandstones and limestones near the top.

The Benton underlies most of northeastern Colorado, and is exposed in a large area along the Arkansas River and as cappings on the Dakota south of the river. It is the greatest oil producer of Wyoming, but has not yet yielded oil in Colorado.

The Niobrara consists of a heavy gray limestone at the base followed upward by an alternation of limestone and light colored limy shales. This lower member is the Timpas. In many places the basal strata are chalky. Overlying the Timpas is a series of several hundred feet of gray to black shale, limy shale, and a few strata of sandstone and cream-colored limestone. This is Apishapa.

The Pierre is mainly a grayish-black shale series ranging in thickness from 1,300 feet near Trinidad to 7,700 feet near Denver. Sandstone lenses and strata break the monotony of the formation in northern Colorado and some thin limestone occurs at various points. The sandstone strata are distributed irregularly through a vertical distance of 1,800 feet, to which has been given the name Hygienic zone after the most persistent sandstone member. The formation underlies all northeastern Colorado and extends east into Nebraska. South of the Arkansas River there is but little Pierre except in the Trinidad coal field. It yields the oil of the Florence and Boulder fields.

The Fox Hills may be regarded as a sandy upward continuation of the Pierre. Near the foothills the formation is very largely sandstones, but eastward it is less and less sandy until it is difficult to draw any line between it and the Pierre. In its northern outcrops the heavy upper sandstone is called the Milliken. In the south a similar member is called the Trinidad. Above these are others not specifically named except in the Trinidad coal field where the lower coals are associated with a sandstone called the Vermejo.

The Pierre shales were laid down in marine waters, the Fox Hills formation in brackish waters and the Laramie in fresh waters. The first fresh water deposition was that of the Vermejo in the Raton coal field, and it is probable that there was never a complete return to marine conditions east of the range in Colorado. The Laramie consists of a rather persistent basal sandstone overlain by

an alternation of shales and lesser sandstones and coals. Along the foothills the stratification is fairly regular, but farther east it is extremely irregular. Cross-bedding, lenticular bedding, rapid alternations of shale and sandstone are characteristic.

There is a pronounced break in the fauna between the Fox Hills and the Laramie. The formation is present in the greater part of a triangular area between the foothills and a line drawn from Colorado Springs to the northeast corner of the state. The "Laramie" west of the range will be considered later.

If the Laramie as now delimited east of the Front Range is taken as the typical or true Laramie it is doubtful whether there is any true Laramie west of the Front Range, in Colorado. The "Laramie" of the San Juan, the Grand Mesa, the Grand Hogback and many other areas all contain a pre-Laramie or Montana fauna at the base. In the vicinity of Craig the Lewis shale is overlain by a series of shales, thin coal beds and prominent sandstones. In the basal part of the series is a pre-Laramie or Montana fauna, but in the top there are Laramie plant fossils. This may be a transition to true Laramie.

The Mancos of western Colorado is roughly the equivalent of the Benton, Niobrara and lower Pierre. It consists of gray to black shales with a few limestone and sandstone strata. Benton and Niobrara fossils are locally abundant in the lower part of the Mancos, and Pierre fossils occur in the upper part. The formation ranges from 3,000 to 5,000 feet in thickness.

The Mesaverde is the great coal-bearing formation of Colorado, New Mexico, Utah and Wyoming. It consists of a series of alternating sandstones and shales of Lower Montana (Pierre) age, containing several seams or groups of seams of coal. A prominent feature of the formation is the development of massive cliff-making or ridge-making sandstones.

Overlying the Mesaverde is the Lewis shale, a marine formation containing a Montana fauna. These relations show that the Mesaverde represents a period of fresh water, coal-making conditions within Montana time. Moreover, the evidence shows that the time of the beginning of

such coal deposition was not the same in different parts of the area in which Mesaverde coals occur in New Mexico, Colorado, Utah, Wyoming. It was earliest in the south. The Lewis shale resembles the Mancos, but is more variable in character, and in a few places is coal-bearing, and in several places coal-bearing strata conformably overlying the Lewis contain fossils which seem to relate them more closely to the Montana than to the Laramie east of the range.

The "Laramie" of the southwest rests conformably on the Lewis. It consists of a basal sandstone member called the Pictured Cliff sandstone, followed by shales and coal. The series appears to be transitional from Montana to Laramie. The flora is distinctly Montana in type, the vertebrate fauna is older than Laramie and the invertebrate fossils might be classed anywhere within the group from the base of the Fox Hills to the top of the Lance.

The coal series of the Grand Mesa field at the south end of the Uinta basin are probably of the same age as those of the "Laramie" of the San Juan--either late Montana or transitional from Montana to Laramie. The Rollins sandstone at the base may be equivalent to the Pictured Cliff sandstone, and the Bowie and Paonia coal-bearing shale members may represent the coal-bearing "Laramie" series of the San Juan basin.

The "Laramie" of the Yampa and other northwestern coal fields consists of a thick group of sandstones and shales containing seams of workable coal of fair grade. The formation is conformable on the Lewis and the invertebrate fossils found are of Montana (Lewis) affinities. It is more closely related to the "Laramie" of the San Juan than to the Laramie of the Denver basin.

In later Fox Hills time in eastern Colorado parts of the great Cretaceous sea were converted into brackish and fresh-water lagoons, deltas and swamps, and in them were laid down the lower coals of the Trinidad field. Whether the entire conformable series was completed in this area we do not know, but if it was, there followed a land period during which the entire Laramie and a part of the Vermejo were eroded away, and a much later formation, the Raton, also coal-bearing, rests unconformably on the Vermejo.

Farther north the Fox Hills was marine or brackish water to the end, and it was closed by a gentle uplift which converted a part of the sea floor into land, but left a large area bordering the mountains and stretching far to the northeast occupied by brackish and fresh water swamps and lagoons in which were deposited sandstones, shales and coal in stratigraphic conformity with the underlying Fox Hills.

These beds are the Laramie formation. They are as a rule discontinuous and suddenly variable both in structure and composition, but there are a few strata which are notably continuous—particularly the great basal sandstone resting on the similar Fox Hills strata. Between the fossiliferous Fox Hills and the fossiliferous Laramie are beds barren of fossils and the Laramie flora and fauna bear little or no resemblance to those of the Fox Hills.

CLOSE OF THE CRETACEOUS

By late Laramie time the great mediterranean sea basin which in its widest part reached from central Utah to central Nebraska and Kansas, had received deposits of Cretaceous shale, sandstone, limestone and coal in thickness ranging from 2,000 feet in the border area to approximately 12,000 feet in the vicinity of Denver. Filling, and probably gentle elevation, had brought the sea floor almost to sea level, and in eastern Colorado and far to the north and northeast there remained only brackish and freshwater lakes and lagoons in which coal deposits were being made. Marine conditions may have continued a little longer in central and western Colorado.

The mountain-making process began as an irregular arching of this broad zone until the central part reached an elevation of 5,000 to 6,000 feet. Stresses accumulated in the central and western portions and a line of weakness developed where the eastern foothills now stand. The mountain mass was thrust up dragging with it and steeply upturning the sediments which extended across the zone of weakness, far onto the upward moving mountain block. Along this zone of weakness the differential movement reached several thousand feet, and the rocks are stretched, folded, faulted and crushed.

Accompanying this upheaval and continuing after the major movement had ceased, were tremendous outpourings of lavas which covered great areas, intrusions of vast bodies of molten rock which did not reach the surface, and explosive volcanic eruptions which scattered volcanic ash and other fragmental material far and wide in such quantities that great thicknesses of sedimentary beds were made from them.

The results of this period of upheaval are the great mountain ranges and groups of the state, for they all belong, in the main, to this general period, though many lesser movements added to them. The igneous activity also recurred at intervals during Tertiary time, and the last outbreaks are probably as late as Pleistocene or Recent time.

CRETACEOUS LIFE

Vertebrates are the dominant feature of Lower and Upper Cretaceous life. Sharks of modern type, and herring, cod, salmon, mullet and catfish were plentiful in the Upper Cretaceous. Large carnivorous fish—the saurodents, inhabited coastal waters. The amphibians were losing ground, but the reptiles held sway in the sea, on the land and in the air until nearly the close of Cretaceous time when the mightiest, most diverse and the most fantastic animal dynasty that ever appeared suddenly fell, leaving only an insignificant posterity for the present.

Turtles and crocodiles inhabited both fresh and marine waters. Lizards and snakes made slow progress. The mammals also advanced rather slowly, were modest in size and few in number. In late Cretaceous they began to show Cenozoic features.

The birds had made notable progress, and there was already much diversity in size and power of flight. Some had powerful wings while others could not rise from the ground, but used their wings to aid their legs. The hesperornis was a wingless bird of reptilian form having toothed jaws. The ichthyornis was a winged aquatic bird of reptilian type, having toothed jaws.

The mollusks were very numerous and oysters of enormous size were common. Gastropods made great progress

and straight, regularly coiled and irregularly coiled forms existed. Ammonoids declined. Corals, and brachiopods were scarce in the great western interior sea, and crinoids had declined. The Cretaceous corals resembled those of today. Insects of many modern types were plentiful.

The plant life of the Jurassic continued into the Lower Cretaceous and was characterized by ferns, horsetails, conifers, cycads and bennetites. The notable change is the appearance of angiosperms, sparingly in Portugal, but very abundantly in eastern and central America. They included both monocotyledons and dicotyledons, developed very rapidly, and, though scarce in the earliest Comanchean rocks, they are the dominant types of plants in the upper beds, and have yielded 400 species. Many genera are similar to those now living, and include figs, magnolias, tulip trees, laurels, and cinnamon. The cycadeans had become scarce, and conifers and ferns were also reduced in numbers.

Flowering plants predominated even at the opening of the Upper Cretaceous. Before its close, the flora took on a decidedly modern appearance. The forests included the oak, beech, walnut, birch, sycamore, tulip tree, laurel, maple, holly, cinnamon, oleander, and other present day fruit and nut-bearing trees. The conifers included the sequoias (the giant trees of California). In later Cretaceous times, monocotyledons became prominent and included the palms and grasses.

The flora spread rapidly, and no climatic zones seem to have hindered its progress. In many respects, it resembles the subtropical flora of today, though it extended as far north as middle Greenland.

CENOZOIC

The close of the Cretaceous with its great mountain-making upheaval witnessed the final withdrawal of the seas from the state and from nearly all the Rocky Mountain region. The mountain upheaval had changed the surface of the state from low-lying plains to a vast western plateau having an average elevation of 8,000 feet, a mountain zone much of which stood over 14,000 feet above sea level, and a broad eastern plain sloping from an elevation of 7,000 feet

against the mountains to about 4,000 feet at the eastern margin of the state.

In Eastern Colorado there were no seas and probably no salt lakes, during Tertiary time. The rocks of this period were laid down in great shallow fresh water basins, and by flooded rivers whose valleys were ill-defined and whose channels were constantly changing. The rocks include sandstones, conglomerates, shales, limy sandstones, and limy shales or marls grading into limestone. The bedding is extremely irregular and the character of the rocks changes very rapidly both vertically and laterally. The rapidly changing conditions were not generally favorable for abundant life, either plant or animal, although locally it was very plentiful.

At first the drainage of all these areas would be such as to afford little chance for the development of lake basins in which sediments could be deposited. But along the borders of the mountains where the gradient of the rivers changed rapidly from their torrential mountain courses to the gentler sloping valleys on the plains, lake basins were formed and much coarse material was deposited as great alluvial fans or deltas spreading far into the basins. Beyond these coarser sediments, the finer sands and clays were laid down in more regular and continuous beds. We may group the Tertiary rocks of eastern Colorado in two groups:

1. Eocene—all of those just east of the mountain front, from northeast of Denver south to Colorado Springs, and those of the Trinidad-Walsenburg-Spanish Peaks area—a total of about 4,500 square miles.

2. Oligocene and later—all those along the northern border of the state, and the broad eastern belt from the South Platte to the New Mexico line, 17,500 square miles.

Just north of the Arkansas, this belt extends westward and overlaps the Eocene area in the eastern part of El Paso County. South of Township 11 south, or south of parallel 39° , the Arkansas River and its tributaries have cut their valleys through the Tertiary formations and have completely removed them from large areas, exposing the Cretaceous formations and in many places all the later Cretaceous strata have also disappeared.

EOCENE

East of the Front Range coarse and irregular deposits were formed along the mountain front. One of these extends from Boulder County to El Paso and eastward from the foothills 40 to 50 miles. It has an average thickness of several hundred feet and a maximum of 2500 feet.

Various names have been given to different parts of the formation on the supposition that they were of different ages. The different parts are deposits of one period brought to the basin by different streams from different areas. The Dawson part is mainly granite debris, the Arapahoe is largely crystalline rock waste, and the Denver is mainly andesitic debris from a volcanic area, with granitic sand at the top. The Cuchara and Poison Canyon formations of Huerfano and Las Animas counties consisting of pebbly conglomerate, coarse cross-bedded sandstones, sandy shales and greenish yellow and brownish red clays were laid down under similar conditions, but a little later.

Numerous formations in central and western Colorado are almost the exact equivalents of the Arapahoe and Denver both in fossil content and material make-up. Among these are the Middle Park Beds, the Animas Beds near Durango, the Ohio Creek and Ruby of the Anthracite and Crested Butte region. The San Juan tuffs are probably of about the same age. The Torrejon and Puerco formations which overlie the Animas Beds southeast of Durango are of the same general age. They are made up of shales and soft sandstones of various colors from gray to red and black.

All the older reports on the Tertiary of Northwestern Colorado describe a conformable series of great thickness including the Wasatch, Green River, Bridger and Uinta. More recent study leads to the conclusion that the Wasatch and Green River are phases of the same great series of sediments, deposited under conditions similar to those which prevailed in the Denver Basin during the deposition of the Dawson, Arapahoe and Denver "formations."

Rivers from the recently uplifted Uinta, Park and Wasatch ranges carried their loads of sediments into the low bordering lowlands, building alluvial fans which in

places coalesced and formed lake basins, swampy areas and floodplains in which regularly stratified beds of finer materials were laid down and in which plant materials might grow for the making of coal or oil shale.

Under certain conditions long arms or tongues in which such lacrustine conditions (Green River) prevailed would stretch far into the normal Wasatch territory of coarser sediments, as in the case of the Tipton tongue and the Laney shale member of the Green River.

Again the Wasatch type of sedimentation would transgress the Green River territory and the Cathedral Bluffs tongue of Wasatch was formed.

The most notable feature of this twin formation is the great deposits of oil shale containing the possibilities of an oil supply far exceeding the well oil resources of the whole United States. These oil shales are most richly developed in Colorado, but Utah and Wyoming have inherited vast treasures of this material.

The Wasatch phase of the formation is largely fluvatile and consists of variously colored clays and sandy clays alternating with crudely bedded sandstone, grits and conglomerates. The sandstones are mainly gray, buff and brown, but white, pink and red beds occur.

The Green River phase is largely lacrustine sediments consisting of coarse brown sandstones, at the top, and finely laminated shale, interbedded with oil shales. Parts of the formation are highly calcareous and silicified oolitic limestone, and calcareous algae reefs occur.

The Wasatch of Southwestern Colorado is a more homogeneous formation of variously colored sandstones and shales with a massive cliff-forming basal sandstone.

The Bridger consists of river and lake deposits of ash-gray and drab clays or marls with a few bands of vivid green sandy layers or sandstone. Thin limestone and conglomeratic beds occur. The formation weathers into bad lands topography. There is an unconformity between the Bridger and the Green River.

The Huerfano of the Trinidad area is of Bridger age. It consists of a great body of heavy-bedded coarse sandstones, in many places cross-bedded and conglomeratic.

Near the base are clays and marls. The whole formation is brown or reddish brown.

The Raton formation lies unconformably on the Vermejo in the Trinidad coal field, and consists of 1800 feet of brown to buff sandstone, yellow to black carbonaceous shale, and numerous coal seams. There is usually a conglomerate at the base.

The Arapahoe is coal-bearing in the vicinity of Scranton east of Denver.

The Coalmont of North Park is a great body of coal-bearing strata consisting of sandstone, conglomerate, shale and coal resting unconformably on the Pierre, and assigned to the Lance on the rather insufficient evidence of poorly preserved plant remains.

Coal-bearing strata believed to be later than Laramie and, therefore, probably Eocene, occur in Moffat and Routt counties. They are overlain by Wasatch, Eocene. In a few places in Northwestern Colorado there are thin coal seams in the middle part of the Wasatch. In the White and Grand River coal fields certain strata at the very base of the Tertiary (Wasatch) are believed by some geologists to be of Fort Union age.

OLIGOCENE

The White River of Northeastern Colorado is commonly divided into the Chadron and Brule. The Chadron is composed of about 200 feet of poorly consolidated strata mainly of sandy clays, and greenish-gray sandstones, mostly of soft texture. The beds are notably discontinuous and suggest channel deposition. The Brule consists of massive hard sandy pale-pink clay having a thin stratum of limestone near the base. In many places in Eastern Colorado beds of gray volcanic ash occur in the Brule. Fossils of mammals and turtles are common in some localities. The White River underlies a very large area in Northeastern Colorado but outcrops are narrow owing to the nearly equal distribution of the overlying Miocene and Pliocene.

A series of sandstones and shales in the southern part of Middle Park is assigned to the Uinta, but on no very convincing ground. The Uinta of the Uinta Basin is probably represented by the Browns Park.

The Castle Rock Conglomerate of the Castle Rock quadrangle is of White River, Oligocene age.

MIOCENE

The Browns Park Formation occupies a large part of Moffat County, extending in a widening band from Craig westward to the Utah line. It unconformably overlies rocks of all ages from Paleozoic to Tertiary. It reaches a maximum thickness of 1500 feet or more. The basal part of the formation is a sandstone containing conglomerate beds composed of granite, gneiss, schist, quartz and quartzite pebbles. Above this the greater part of the formation is soft, white sandstone of chalk-white color, and poorly cemented with lime carbonate. The age is uncertain, but the only fossil evidence suggests Miocene, or uppermost Oligocene.

The Bishop Conglomerate occurs as small caps on Diamond Peak and Lookout Mountain and other high points in Moffat County. It is very probably a series of remnants of the basal conglomerate of the Browns Park Formation.

The Santa Fe formation outcrops upon the older sedimentary and igneous rocks almost entirely around the San Luis Valley. So far as exposures are concerned it is the oldest of the Tertiary lake beds flooring the park. It consists of conglomerates, sandstones, gravels and clays. The materials contain much igneous debris and waste from the older formations.

Similar beds along the Rio Grande near Creede are believed to be of the same age as the Florissant. The Florissant beds contain a rich flora and an insect fauna commonly assigned to Miocene age. The strata are largely of volcanic ash. The Alnwick and High Park Beds are not definitely assigned as to age but are believed to be later than the Florissant Beds in the same general area.

MIOCENE AND PLIOCENE

The Arikaree is in many places unconformably on the White River and consists of loosely consolidated sands and sandstones in which are many irregular calcareous concretions especially in the lower part. Overlying these deposits

unconformably are deposits of sand and gravel and calcareous grits, "mortar beds," called the Ogalalla. On the basis of vertebrate fossils the formations are assigned to "latest Miocene or first phase of Pliocene."

The Nussbaum loams, sands and gravels capping divides and other high areas in parts of Southeastern Colorado have been correlated with the "Tertiary grit" and "Plains marl" described by Kansas geologists, and supposed to be of Pliocene age. It is possible that in some cases this correlation is correct, but it is probable that in a number of cases these deposits are of Pleistocene and Recent age.

PLIOCENE OR PLEISTOCENE

The Alamosa consists of a series of alternating sands, gravels and clays unconformably on the Santa Fe. It is the great artesian water-bearing formation of the San Luis Valley. On the evidence of fresh water fossils it is assigned to late Pliocene or early Pleistocene. The formation is composed of materials carried by stream from the surrounding higher country into the great San Luis lake basin.

QUATERNARY

PLEISTOCENE AND RECENT

The principal deposits of Pleistocene and Recent times in Colorado are alluvial gravels, sands and loams along the stream courses; wind blown sands, dunes and loess back from the streams and on the plains in general; moraines in the higher mountain valleys; and peat and swamp muck in disappearing glacial basins and swampy floodplain areas.

In Pleistocene time glaciers occupied large areas in the higher ranges and probably at times coalesced into ice caps of considerable area in the San Juan, the Sangre de Cristo, the Medicine Bow, Park and Front ranges, and individual alpine glaciers were very numerous.

The geological work of today consists in the weathering, breaking down and removal of debris from the surface of the state, the conversion of hard rock into soil, and the preparation of plant food by the decay of rocks.

CENOZOIC LIFE

Almost all the lower groups of animals had become modern in character. The trilobites, brachiopods, am-

monites and others had given way to modern groups of crustaceans, bivalves, cuttlefish and others.

Fishes, amphibians and reptiles had passed their prime, and the species resembled those of today. The birds exchanged the bony, toothed, reptilian jaws for the present type. The long vertebrated tail disappeared. Flightless forms such as the ostrich were common in Cenozoic time and some have persisted to the present.

Mammals became the dominant type, but these were in many respects different from those of today. Generalized forms were common, and it is not possible to group Tertiary mammals so definitely into Carnivores (flesh eaters); Ungulates (hoofed animals); Rodents (gnawers); Getaceans (whales and dolphins). These generalized forms had features belonging to several of the present day groups. The horse, deer and rhinoceros families with their special and distinct features may be traced back to a peculiar 5-toed animal having a full set of rather simple teeth, and of no greater size than an average dog. The dog, cat and bear families are traced to an animal similar to the ancestor of the horse, deer and rhinoceros.

Evolution was very rapid and bone deposits show remains of both the modern differentiated forms and the earlier generalized types. By middle Tertiary the main divisions of the Mammals were distinct, and cats, horses, monkeys, whales, bats, elephants and many other kinds were represented, but the forms were not just the same as those now living. For example, the horse had three toes.

A very large part of the plant life took on modern forms in early Cretaceous times, and, while the genera were in many instances the same as those now living, the species were different. In early Tertiary times, even the species became, in large part, modern.

The flora of the Denver beds (Eocene) contains figs, poplars, laurels, magnolias, and many ferns, and is similar to that of the Eocene of Southern British Columbia, 630 miles farther north. In many temperate zone areas, the Middle Eocene flora was tropical in aspect, and Greenland and Alaska had temperate zone floras, with luxuriant forests.

Prominent among the Eocene trees of America were:

the banana, palms of many varieties, myrtles, beeches, oaks, willows, poplars, sycamores, elms, laurels, magnolias, maples, walnuts, pines, spruces, cedars, and others.

Grasses took possession of all open spaces in Miocene time, and the general character of the vegetation even to the northern limits of the United States, was subtropical. In the volcanic tuffs of the Yellowstone Park are buried poplars, oaks, hickories, elms, maples, magnolias, and sycamores. The bread-fruit grew in Oregon. But the subtropical types gave way largely to temperate zone forms before the close of the period. At Florissant, the flora was of a warm temperate character, and contained sequoias and other trees of similar habits.

Zonal divisions of climate became prominent in the Pliocene, and with them there was a gradual withdrawal of tropical and subtropical species to their present habitats, and the temperate flora became the prevailing type over a large portion of North America.

ORE MAKING

The Tertiary was the greatest ore-making period in the history of the state. To this age belong all the deposits of the San Juan, Aspen, Leadville, Tenmile, Redcliff, Cripple Creek, and in all probability, all those of the northern part of the great sulphide belt stretching from Boulder County to the San Juan. In many parts of this great area the ores are in rocks of much greater age but the conditions which led to their formation were those accompanying the great mountain-making revolution beginning at the close of Cretaceous time and continuing interruptedly to the end of the Tertiary and possibly into Pleistocene time.

The tremendous outpourings of lavas were not confined to the Eocene stage of mountain making but continued at intervals through Tertiary times and into Pleistocene. And the great porphyry intrusions along the sulphide belt are certainly not the results of a single outbreak of igneous activity. The great monzonite intrusions, so closely related to ore-making, represent successive convulsions, probably marking the times of other mountain making movements only a little less important than that which initiated the building of all the Colorado ranges.

The rise of lavas and other igneous rocks to the surface is accompanied by vapors, gases and highly heated mineral-charged waters. The folding, faulting and crushing of the rocks in these great movements form channels of circulation for the mineralizing solutions and afford opportunities for them to come into contact with other solutions, vapors and solids by which their mineral content is precipitated and forms ore bodies.

The ores of iron, manganese, uranium and vanadium are the products of the collecting and concentrating work of water and are not the result of Tertiary conditions. Those of molybdenum and tungsten are probably much older than the Tertiary.

Gold and silver are mined in pre-Cambrian, Carboniferous and Tertiary, but the richest deposits are in the first and the last.

Lead and zinc come from pre-Cambrian, Carboniferous and Tertiary.

Copper—practically the same as for lead and zinc.

Molybdenum is found abundantly in the pre-Cambrian and intrusive granites of later age, and in veins in rocks of various ages.

Tungsten occurs mainly in pre-Cambrian rocks but also in Tertiary extrusives.

Uranium and Vanadium and Radium are mined in the Jurassic rocks.

Iron Ore has been mined in formations of several ages—Carboniferous, Ordovician and Tertiary. *Manganese* occurs in Carboniferous, Jurassic, Triassic, Cretaceous.

Selenium is found in many localities and is a recoverable by-product from several Colorado ores.

Tellurium occurs native in Boulder, Gilpin, Clear Creek, Saguache and other counties.

OIL SHALES

To the Tertiary we owe one of the greatest mineral resources of the state—oil shales. This is not the product of great convulsions, but of quiet times when vegetation grew undisturbed in shallow lakes, and by natural burial in the slimes and muds was stored up in such a form that



UPPER: A COLORADO COAL MINE
LOWER: THE DISCOVERY WELL, WELLINGTON FIELD

by distillation there may be secured a wealth of fuel especially adapted to the needs of the times.

COAL

In the Cretaceous swamps, lagoons and deltas coal-making plants grew and fell back into the water which protected them from complete decay, but encouraged that controlled decay or change carried on by bacteria and fungi which reduces the proportion of the volatile constituents of plant matter and proportionately increases the fuel constituents and so starts the material on its road to coal.

Then came changed conditions and the rivers brought down and deposited over the plant matter a covering of clay and sand. The pressure of this load developed heat, and by heat and pressure more and more of the non-essentials of the plant matter was given off and coal was formed.

A little coal was made in Tertiary time, but it is of lower grade because the plant material has been subjected to less pressure and for a shorter time.

Colorado stands third in coal tonnage but when quality as well as quantity is considered, she has but one if any rival.

Coal is mined in both Cretaceous and Tertiary formations.

The Colorado oils all come from the Cretaceous.

Oil shale is found in great abundance in the Tertiary.

Clays are the products of rock decay and as Colorado has a very great variety of rocks to undergo decay the natural result is a great variety of clays—suitable for every use to which clay is put. Commercial clays are found in all parts of the state and in a great many formations, but the greatest quantity and the largest variety come from the Cretaceous.

Cement materials are now taken from the Cretaceous only.

Mica comes from the pre-Cambrian.

Building stones are found in the rocks of all ages. The granites come from the pre-Cambrian, the sandstones from Ordovician, Mississippian, Pennsylvanian, Permian and Cretaceous; limestones, from several.

Clays are used from a number of formations, but the Cretaceous furnishes the greatest variety.

Marble has been developed in several formations but the largest deposits are those of the Ordovician in Gunnison County.

The mineral waters in Colorado are in large measure the aftermath of Tertiary upheavals and volcanic activity.

Graphite is found in several localities in Cretaceous rocks.

Barite occurs as veins in the Carboniferous rocks and in the pre-Cambrian, and as a gangue in some of the lead-zinc-silver mines.

Salt in great thickness has been found in drilling for oil in two or three parts of the state.

Gypsum is extremely abundant in the Permian, Pennsylvanian and Triassic, and some is found in the Cretaceous and Tertiary formations.

Potash has been found in drilling for oil.

Rock phosphate occurs in Northwestern Colorado but whether in commercial quantity is not known.

Abrasive and polishing materials of many kinds might be produced. These include quartz, massive garnet, rotten stone, magnetite sand, schists, volcanic ash, grindstones.

Feldspar suitable for porcelains and enamels is plentiful.

Fluorspar pure enough for chemical uses, and suitable for steel manufacture is abundant.

Foundry sands are produced for local use.

Fuller's earth is abundant.

Glass sand occurs in the Morrison.

Semi-precious stones of several varieties are found.

Sulphur has been mined and pyrite is very plentiful.

CHAPTER III

GEOGRAPHY AND NATURAL FEATURES

By James Grafton Rogers

BOUNDRARIES AND EXTENT—THREE PROVINCES, MOUNTAINS IN CENTER, PLAINS IN EAST, DISSECTED PLATEAUS IN WEST — SETTLEMENTS — RIVER SYSTEMS, MISSISSIPPI, RIO GRANDE, COLORADO— CLIMATE, SEASONS—MAIN PEAKS AND RANGES—PLACE NAMES—CLASSES OF LAND FORMS—PARKS—FORESTS—MOUNTAIN RESORTS.

Colorado is the mountain state of the Union. The boundaries were drawn in 1861, to form an outline for the government of a group of mining colonies isolated in an almost unmapped expanse of wilderness. As might be expected, the problem of boundaries was met by drawing a huge rectangle centered on the mining claims.¹ So the boundaries have remained ever since. Oddly enough the rise of agriculture and other new industries to replace mining has not materially shifted the center of population out of geographical balance. The first mineral settlements at the headwaters of Clear Creek have dwindled, but Denver,

¹ The legislated boundaries are 37° to 41° north latitude and 25° to 32° longitude west of Washington. (Not 102° to 109° west of Greenwich as ordinarily stated in reference books. The Greenwich meridians are on the average in Colorado about 2.7 miles east of the Washington measured or true boundary.) The lines as located on the ground vary somewhat from the astronomical lines, particularly the east and west lines being in some places substantially east of the meridian named. The state contains 103,948 square miles, of which about 290 square miles is water surface, and is thus seventh among the states in area. It is about 387 miles wide at the south and 23 narrower at the north, as the meridians converge. Its north and south extent is about 276 miles. The mean elevation of the state is about 6,800 feet, with 14,420 (Mount Elbert) and 3,350 feet (near Holly) as the highest and lowest extremes.

which began as an outfitting point at the edge of the mountains that hid the first mines, still remains the dominant political and population center. The raftlike form of the state still floats fairly balanced so to speak under the load of a million people, though launched with a crew of perhaps thirty thousand.

Within these boundaries, there is contained an extraordinary variety of land forms. Indeed high altitude above sea level and comparative meagerness of water supply are the only characteristics which can be called common to all the state. Even these are not invariable. The slopes of the main ranges support great areas of moist forest that receive more rainfall than New England, and the Arkansas River leaves the southeast corner of the state at a comparatively low altitude.

The main ranges of the Rocky Mountains stream across the state from north to south in the very center of the state. The Rocky Mountains reach their grandest proportions, both in altitude and extent, within its confines. They are the dominating factor in every chapter of the history, population, industrial development, and spiritual attitude of the people. Their tumbling forms stretch across the mental if not the physical horizon of every citizen.

Colorado, like another more classic country, divides naturally into three parts. The Rocky Mountains occupy the central strip. These mountains, in the form of north and south chains, separating, crossing and rejoining, like the channels of a floodplain river, with occasional immense level plateaus or "parks" standing like islands among the meandering ranges, occupy a belt perhaps a hundred miles wide across the state. To the east a wholly different land-form occurs. The mountains give way abruptly along a fairly straight east wall, and from their feet, the Great Plains begin their long uninterrupted journey to the Mississippi and Missouri rivers, six hundred miles away. These Plains are broken only by a few buttes, and cut by the sandy channels of more or less intermittent streams. They occupy the eastern half of the state. They were once the home of wandering buffalo herds. They were essentially treeless, except for the groves of cottonwoods and box-elder that clung to the watercourses. Under the name



TOPOGRAPHIC MAP OF COLORADO
From the model at the Colorado Museum of Natural History



of "The Great American Desert" the plains represented to earlier generations a definite barrier to the western movement of the Republic. Today they are almost entirely fenced into stock-ranches and dotted with a multitude of little, wide-spaced settlements. The great ranches are already breaking up into farms. Along the borders of the mountains and for many miles along the Platte and Arkansas rivers the plains have been for many years given over to intensive irrigation. In these stretches, there are now many substantial towns, and a settled and prosperous farming people of considerable numbers. The plains are definitely committed to a period of settlement and cultivation that will leave them past recognition before long. They are traversed now by six lines of railroads that bridge the gap between the Missouri waters and the Rocky Mountains. At the northern edge flows the Platte River, cherishing a widening strip of irrigated farms, and in the southerly half of the state, the Arkansas River travels parallel to the Platte, effectively providing mountain water for hundreds of thousands of acres of farms in the course of a futile effort to discharge that water into the Missouri valley.

As the Rocky Mountains set off the Great Plains to the east, they also delimit into a definite province the western portion of the state which remains beyond the main mountains. To the casual eye, the character of this western section is less clear. It is cut by deep river channels, less adequately traversed by railroads, seems to contain several mountain chains and on a physical map looks confused. As a matter of fact, however, the western third of the state possesses a common definite character which would be evident to an observer from the air or to a trained student with a good contour map before him. The section is essentially one of stratified and horizontal rocks, cut into flat-topped plateaus or great "mesas" by water channels and only here and there broken by alien mountains thrust up from below. If we conceive of the portion of Colorado west of the Rockies proper as an elevated and much dissected layer cake, we need only add that the cake has been disturbed somewhat by mischievous hands. Toward the south of the state, the San Juan Mountain system rises as a jagged and spectacular mass that has intruded and upset

the region of plateaus. The disturbance here has produced some of the most striking scenery in America, but most of it, because of isolation, remains unknown to the general public. The sensations that surround one among these southwestern precipices are quite foreign to the impressions which are familiar among the great granite domes that make up the Rocky Mountains proper. North of the San Juan Mountains, nearer the center of the state and close to the western margin of the Rockies, are the Elk Mountains and the West Elk Mountains, which are somewhat similar but smaller disturbances of the plateau region. Outside of these instances and a few others of lesser importance, Colorado beyond the stream or belt of the Rockies, is a country of plateaus, usually better watered and therefore more eroded and irregular than the corresponding slope to the east.

If Colorado is conceived as the roof crest of the western continent, with a broad ridge pole in the Rocky Mountains, a well-preserved and smooth shingle roof to the east, in the Great Plains, and a badly weathered roof to the west, in the Plateau Region, which western slope is interrupted by some dormer windows, in the shape of the San Juan and Elk ranges—if this rough simile is kept in mind, we hold the key to its geography. This key opens also most of the history, the politics and the traditions of its people, present and past. The statesmen, the railroad builders, the industrial leaders, the idealists of Colorado are and have been like the Indians who preceded them, controlled and pre-occupied by these geographical facts. Unless air transportation or some unknown factor revolutionizes all the present problems of human communication, the men of the future will think in the same terms.

The state of Colorado is a territory still in the stage of human settlement. Its history and its immediate future read most readily, not in terms of racial, political or idealistic factors, elsewhere, but in terms of geography. The opening of the year 1858, after some stages of exploration and even former residence by trappers, found the state almost without white habitation. The mountain mass was isolated from the human culture that almost completely surrounded it in Kansas, New Mexico, Utah and the head-

waters of the Missouri to the north, by two geographical facts. On the one hand the area and bulk of the Rockies turned the transcontinental trade routes away to the north and south. In the second place, the mountains were belted with arid plains or plateaus on every side. When in 1858 and the years following, the exploitation of gold furnished a motive to men to bridge these gaps, the geographical isolation was broken and settlement flourished.

Settlement followed several distinct formulas. One of these was the establishment of towns based on valley routes into the mountains, usually at the outlets of these valleys, such as Denver, Pueblo, Grand Junction, Canon City, Boulder, Durango and so on. There was also a series of mineral towns placed within walking distance of the mines and therefore often perched on all sorts of fantastic sites. Central City, Blackhawk, Georgetown, Creede, Telluride, Leadville are examples of towns so situated on precious mineral sites, and Trinidad, Walsenburg, Louisville and Lafayette are based on coal mines. The third formula or basis for settlement was that of agriculture, which in turn is reducible to a question of water supply on level land at relatively low altitude. Of towns based on this condition Greeley, Fort Collins, Longmont, Brighton and Loveland are almost pure examples. Many important towns are stations on valley routes, either highways or railroads or both, around which irrigation has developed from simple proximity, such as Grand Junction, Las Animas, Lamar, Fort Morgan, Sterling, Delta, Del Norte, Alamosa and Montrose. Most of these towns are accumulations of agriculture on a large scale around an accidental nucleus of settlement. A fourth sort of settlement is based on health or aesthetic factors. Colorado and California have, perhaps, because of their combination, in each case from different causes, of sunshine and moderate air temperature, seen more communities located from purely aesthetic reasons than any regions in the world. In Colorado, Colorado Springs is the notable example of this form of settlement with smaller colonies illustrated by Estes Park, Glenwood, Grand Lake and the Platte Canon and Bear Creek villages. The occasions for the growth or location of towns that loom so large in the records of our race are mostly missing in this

new state, for all its million souls. Navigable rivers, proximity to raw manufacturing materials, political capitals, military protection, and other familiar causes are so far negligible in the history of its prevailing towns.

As land forms are the product of water channels, rather than water channels the result of ranges and valleys, the drainage of the state first attracts the attention of a topographer. Practically no water enters Colorado from other states. In this respect it is unique. Three great river systems, made up of six long rivers, rise within and flow out of the state. There are merely negligible exceptions to the rule that all the streams flow outwards. One of these exceptions, the Cimarron River, cuts the extreme southeastern corner of the state, travelling across it for about twelve miles on its way from Oklahoma to Kansas. The other exception worth noting is the Green River, which cuts the northwestern tip of the state for perhaps twice that distance, entering from Utah, and returning suddenly to Utah as though repenting of its infraction of the rule. Both the streams named touch remote corners of the state and are unimportant in its story.

The state drains into the Mississippi, the Rio Grande and the Colorado River systems. There is a point near Poncha Pass, just south of the center of the state, where a few feet difference will determine the course of rain water as between these three routes to the sea. As the first two systems reach Atlantic waters via the Gulf of Mexico, and the Colorado joins the Pacific via the Gulf of California, we find that the Continental Divide crosses the state from north to south. Its course is irregular and most of the notable mountains and ranges lie off its route.

Of the major streams, the Platte and Arkansas rivers both belong to the Mississippi system, both rise in the recesses among the highest mountains, follow winding courses through gorges to escape from the impeding ranges and when they reach the plains run parallel like twins, easterly to the Mississippi across the open plains. The headwaters of both these rivers run first across broad and lofty valleys among the summits in the center of the state. They then enter deep trenches—the Cañon or Royal Gorge of the Arkansas and Platte Cañon. Both these cañons are

now established but precarious railroad routes. Emerging from the mountains, at the foot of their cañon course, the rivers drop their load of sand and rock flour. Then for about two hundred miles each becomes a prairie stream. Each is joined by uncertain prairie tributaries, the Picket Wire, or Purgatory River, which comes into the Arkansas River from the south, being the best known and perhaps largest of these plains branches on either stream. Through this last stage the Platte and Arkansas were originally uncertain and sometimes intermittent streams, straggling at the worst in shallow channels and often mostly beneath the sand through valleys that were distinguishable from the open plains only by the groves of cottonwood trees. In May and June, when the snow thawed in the mountains, or later when thunder storms drenched their water sheds, the rivers carried prodigious quantities of water and often flooded the valleys miles wide. Today in the stretches across the plains, their character is much modified. The rivers are now bled all along their courses by numbers of irrigation ditches, some as large as freight canals. These diversions temper the floods, and the return waters from the irrigated lands, percolating through the soil or establishing perennial streams in the lesser tributary swales, have equalized the flow of both rivers. The twin rivers are now everywhere continuous streams except in extreme dry seasons. The first two wagon trails across the plains followed these river beds, the Santa Fe Trail on the Arkansas River in the south, and a branch of the Overland Trail on the Platte River in the north. Today two principal railroads persist in the old wagon ruts, and are fed with shipments of alfalfa hay, wheat, corn, sugar beets, livestock and general farm products from belts of irrigated lands that border the river channels. Most of the principal towns of the plains section are beaded along them, Julesburg, Sterling, Fort Morgan and Denver on the Platte River and Lamar, Las Animas, La Junta, Pueblo and Canon City on the Arkansas.

The densest population of the state has collected in the fringe along the foothills in the center of Colorado where these two rivers and their tributaries first leave the wall of the mountains. Here, in a north and south line, curiously

straight to one who does not understand the reasons, runs a string of important communities, such as Fort Collins, Greeley, Loveland, Longmont, Boulder, Denver, Colorado Springs, Pueblo, Canon City, Walsenburg and Trinidad. Most of these communities are agricultural. A few have industrial or coal mining activities. Whatever their character, their location is determined by streams which suddenly emerge from the mountain wall. These towns and the meridian strip of counties which they represent contain about two-thirds of the population of the state. The principle determining their location is as well marked as that which established the towns along the fall line of the New England rivers, or the cities on junction points of the Mississippi drainage, or the oasis towns of Asia.

Moving on from the drainage of the Platte and the Arkansas rivers, we find to the southwest the head waters of the Rio Grande River. The Rio Grande rises in a sort of bay thrust into the state near the center of its south boundary line. The main waters accumulate in a spectacular region on the easterly slopes of the San Juan Mountains, in the southwest corner of the state. The stream flows easterly and then enters the San Luis Valley, turns south through the open sweeps of this great basin and leaves Colorado for its long journey through New Mexico and between Texas and Mexico to the Gulf. The drainage basin of the Rio Grande del Norte, (to use its full title) is smaller within Colorado than the other important basins, and the water is still nearly eight thousand feet above the sea when it leaves the state, but the river travels a section whose interest for the traveler is out of all proportion to its relative area. In the upper reaches, the course is through a splendid glaciated canon. The river is there a famous trout stream. Creede, an old mining camp that won a place in frontier literature, is hidden on its upper reaches. The San Luis Valley, which the river traverses next, is one of the four and much the strangest of the great "parks," or mountain basins, that are so notable in the central Rockies. It is a dead-level plain, about 100 miles north and south by fifty miles wide at the east and west extremes, so flat that scarcely a mound or a drainage channel is visible to the eye, and walled in by appalling mountain heights particu-

(Courtesy of the Denver and Rio Grande Western Railroad)

PIKE'S PEAK

Altitude, 14,109 feet above sea-level. Gateway to the Garden of the Gods in the foreground.



larly abrupt on the east. Yet the floor of this plain is nearly half as high again above sea level as the top of the highest mountain east of the Mississippi River. The San Luis Valley has a great supply of uncontrolled artesian water, and in the northeastern corner, displays a stretch of sand dunes that suggest an Asiatic desert. Directly above the range of white dunes are pitched the Sangre de Cristo Mountains, usually blanketed with equally white snow. These "Blood of Christ" Mountains seem to have been named for the alpine glow that sometimes at dusk is intense enough to tint the whole San Luis Valley. In this upland museum, traversed as it is by a river whose associations with European settlement are older than Jamestown or Plymouth, is now a modern agricultural community. In spite of some odd water problems and the short season, farming here supports some considerable population. Alamosa, Monte Vista, Antonito and Del Norte, for all their reminiscent Spanish names, are substantial modern towns.

The third and remaining river system occupies most of the western half of the state. It consists of the Colorado River and its tributaries, mostly large streams trending west from the backbone of the Rockies. The Colorado River proper (once called the Grand) occupies the middle of the western third or plateau section of the state. Even at its headwaters in Colorado this is one of the large trans-Mississippi streams. It rises in Grand Lake and thereabouts in the far north-center of the state, in the Rocky Mountain National Park. Its head has cut so far east into the mountains that it is possible that snow banks feeding the Colorado River may be visible from the plains near Denver, far down on the other slope of the Continental Divide. Grand Lake, the source of the river, is the largest natural body of water in the state² but at that is only about two miles by one in area. The lake nestles close into the crest of the Rockies, at an altitude of 8,369 feet. It is now on the route of much tourist travel, through the National Park. Its shores are clustered with summer cottages and

² Possibly other lakes, such as Twin Lakes and San Luis Lake had larger original areas and there are now reservoirs with still larger areas, but the depth of Grand Lake leaves true the statement above.

it boasts a yacht club and an annual regatta. From the lake almost to the Colorado-Utah boundary, the Colorado River tumbles southwesterly through a series of tinted gorges that perhaps have no superior for display of beauty on a grand scale. Much of the river's lower course is travelled by the Denver and Rio Grande Railroad. The river supports and shelters a number of towns, of which as a resort Glenwood Springs is best known, and, as an agricultural and orchard center, Grand Junction predominates, with about 10,000 people.

At Grand Junction, the Gunnison River, a substantial branch from the south, joins the Colorado River. The Gunnison proper rises on the west slope of the main Rockies and struggles through a long course. On the way it flows through the Black Cañon which has been notable as the scene of many adventurous engineering expeditions and of more incredible fishing exploits. The tributaries of the Gunnison drain a great area in Southwestern Colorado, of varied character. The North Fork rises in the West Elk Mountains and is the entry to a beautiful orchard and stock raising region. The Uncompahgre River, another tributary, flows from the slopes of the San Juan Mountains in the south. This stream rises near Ouray, an old mining town and perhaps as beautifully situated a mountain town as there is in America. Other branches, like the Lake Fork, and Tomichi Creek, finger in every direction into historic country. The towns of Gunnison, Ouray, Montrose, Paonia and Delta all represent clusters of human settlement based on the water routes of the Gunnison, and most are now prosperous modern communities. The Denver and Rio Grande Railroad has followed most of the water channels with standard or narrow gauge rails. Indeed throughout Central and Southwestern Colorado the arteries of that railroad are a sort of sermon on the text of how greatly human transportation in a mountainous country is dependent upon water as its chief locating engineer.

North and south of the Colorado River and its branch, the Gunnison, three other streams also that ultimately join the Colorado outside the state, flow west and roughly parallel the principal stream. On the far north, the Yampa (or Bear) River rises in the Park Range in the western

wall of the Rockies proper. The river cuts straight west to join the Green River at the point where the latter straggles into Colorado for a moment from Utah. Near Lodore Cañon, and just above their junction, in Brown's Hole, on the Green River, was a well-known trappers' rendezvous in the days of the beaver hat a hundred years ago. Here the wandering "free-trappers" of the Central Rocky Mountains straggled together once a year to trade their furs, buy a little powder and flour and carry on a spring carousal. Few western scouts and mountain men whose names linger in history but knew this Brown's Hole rendezvous.

The Moffat Railroad follows the upper course of the Yampa, through such towns as Steamboat Springs and Craig but its much discussed extension westward to Utah has never yet materialized. The drainage area of the Yampa is a high plateau country, rich in water, and containing immense coal and oil fields. Remoteness still checks the population figures.

South of the Yampa flows the White River, likewise westward bound. It is a shorter stream than the Yampa, but robuster and more picturesque, by virtue of its more broken environment. It rises, not like the Yampa in the granite of the Rockies, but farther west in the Flattop Mountains, a typical fragment of the great layer-cake formation of the Pacific slope in Colorado. Beginning there in the rich woods above Trappers Lake, the White River tumbles west, past the quaint settlement of Meeker with its tragic Indian history, through the oil fields of Rangely and so into Utah without ever a glimpse of a railroad track.

At the far south fringe of the state, we find two more important tributaries of the Colorado, and then our survey of the state's water system is done. The first, the Dolores River, is supplied principally by the snow on the west slope of the San Juan Mountains, and thence flows northwest to join the main Colorado in Eastern Utah. Paradox Valley which it crosses abruptly in an unexpected direction has long attracted attention as a topographic novelty and the site of strange minerals. The second southern stream, the San Juan, a more important watercourse, is the product of the south slopes of the San Juan Mountains. These

mountains, a huge pile of volcanic debris, have already been described as a sort of dormer window on the western roof of the continental divide. The dormer seems built out to overlook the southwestern desert, as if the Builder anticipated how much the magic of that desert would creep into American imagination and literature. The San Juan Mountains dominate all the geography and settlement of that corner of the state. The San Juan River gets its water from a series of large torrents on the sunnier side of the mountains whose name it bears, and then skirts the mountains and south line of the state through the desert, in an effort to carry its dwindling waters to the Colorado River in Utah. The effort scarcely succeeds. Near Four Corners, where the states of Colorado, Utah, Arizona and New Mexico come together in the only point common between four states in America, the San Juan River in dry seasons almost disappears in the sand. Yet in its upper reaches it is constantly fed by some of the finest of mountain streams. The extent to which flourishing western rivers shrink and become intermittent in the arid and prairie stretches after they emerge from the mountains is seldom understood by readers from Eastern America. Yet the condition is typical of the whole west and is the clue to the location of most settlements between the Mississippi states and the Pacific Ocean.

The San Juan River watershed is notable for varied interest in Southwestern America. Only its isolation has kept it comparatively unknown to the pleasure-seeking traveller. Today the automobile has begun to supplement the one little narrow gauge railroad that ever penetrated thither. From the view of the economist, the San Juan drains a country well supplied with water, timber, coal and agricultural promise, besides the precious metals which loom so large in its history. Durango, its metropolis, is, in St. Paul's phrase, "no mean city," for all of being cut off from the world by hundreds of miles of mountains on one side and what is practically desert on the other. For the recreation seeker, there are no mountains in the United States of more bold and precipitous grandeur. The student will remember that on the slopes of these mountains are the Cliff Dwellings of Mesa Verde National Park, the ghost-

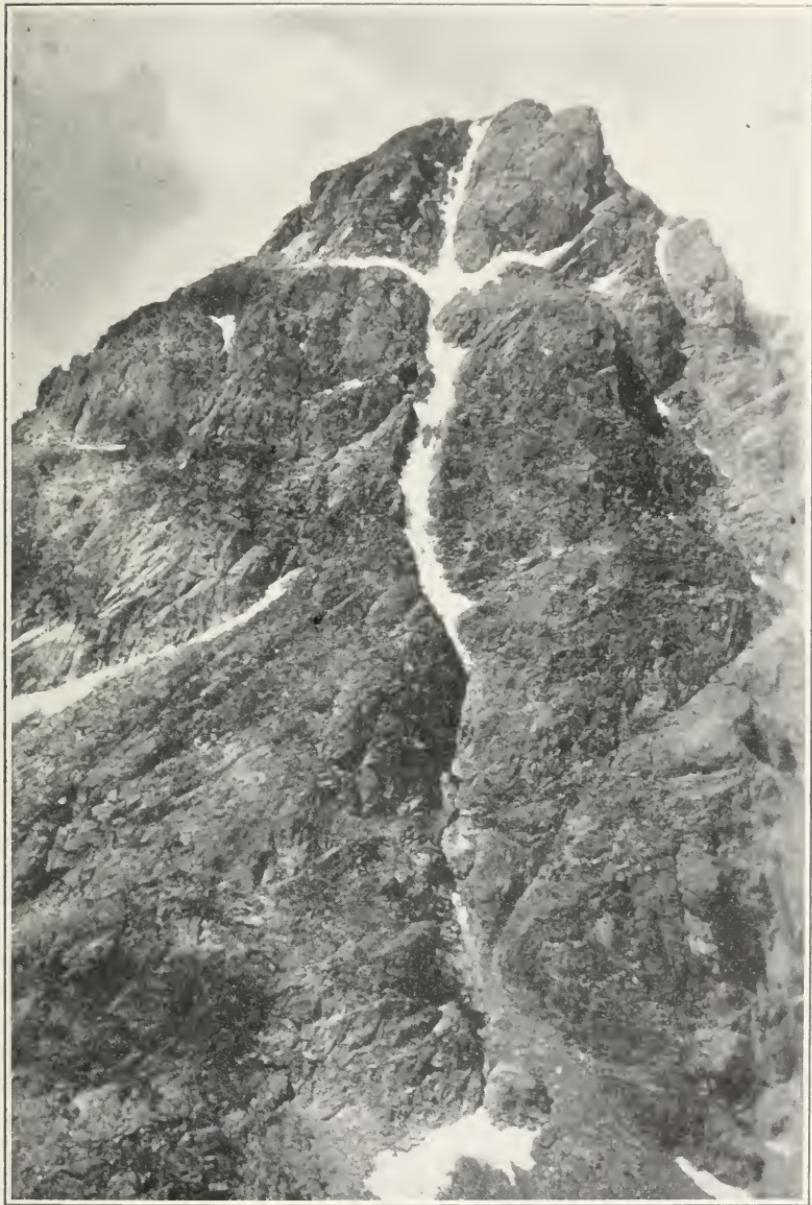
liest relics of our past, that thereabouts the great Navajo Indian tribe lives its Arab-like life and weaves its blankets with Ship Rock as a center, and that Spanish place names of this region were fixed by the Franciscan friar Escalante in 1776. In that year Escalante explored, "for the glory of the Mother of God," as he said, this land of peaks and thirst, when it was as distant and unknown as the mountains of the moon to his contemporary George Washington. It was to remain, after he had passed, still unknown to our Anglo-Saxon people for almost half a century.

So much for the water systems of the State of Colorado and the human culture on them. The Platte, the Arkansas, the Rio Grande, and the Colorado River systems radiate like spokes in a wheel from the mountain mass that dominates the Western United States. As the rivers originate in the snow that these mountains collect, we may turn for a moment to what is known of the source and character of this precipitation. Modern meteorology is learning fast.

The continental drift, as the general trend of the air over the country may be called, carries a fairly steady flow of air from the Great Basin and the Pacific Northwest over Colorado in a general east and southeast direction. This air, drained by deserts and various mountain ranges, has lost most of its water cargo before it reaches the Rocky Mountains. However, the great whirlpools of rising air usually known as "lows" (from the fact that their presence is marked by low barometers on the earth's surface), moving eastward across the continent in this drift or current, suck in air sometimes for a thousand miles or more in every direction and are thus able to draw the warm and water-laden air from the Gulf of Mexico into the inland part of the continent. Thus the water that falls in the Central Rocky Mountains and the prairie region comes mostly from the Gulf of Mexico, it seems. During the winter a fairly steady procession of these lows, alternated by a few days of cold and sunny high pressure, marches from the west across the state and produces precipitation on the mountains. This winter snowfall varies in amount almost directly with the altitude. Five times as much winter precipitation occurs on the fourteen thousand foot peaks as falls on the five thousand foot plains. There are how-

ever some sheltered valleys of seven or eight thousand feet altitude, as for example the Arkansas Valley at Buena Vista, where we find the exception of exceedingly low winter precipitation on account of special local causes. In summer the rainfall throughout the state comes mostly in thunder storms.

It is unsafe to generalize about climate in a state of such varied character and one as large as New York, New Hampshire, Connecticut, and Ohio combined, but a few generalizations can be risked. Colorado is everywhere characterized by brilliant blue skies and consistent sunshine. The precipitation is pretty evenly distributed during the year. There is everywhere a great range of temperature, and a low moisture content in the air. As a result of high altitude and dry air, the nights are notably cool throughout the year. The average annual precipitation for the state is about 17.50 inches but this means little as only about 6.5 inches falls each year in parts of the San Luis Valley, while fifty miles away at Cumbres records show an average of 33 inches a year. There are mountain slopes in several places where no station is now established that would probably record annual average precipitation of over 60 inches. There are small but characteristic glaciers still active on Arapahoe Peak and Hagues Peak in North-central Colorado, and many other permanent snow beds which sometimes move glacially, even as far south as Sierra Blanca. Such glaciers signify considerable precipitation. Except in the high mountains, the winters are strikingly open. Through many winters tennis can be played in the localities of the larger towns with only occasional interruption for a day or two. The snow that falls in the valleys and on the plains is usually gone in a few hours. The juxtaposition in spring of immense snow-drifts, flowers at their edge and dusty roads alongside is often noted by travellers. As in other western states, the day skies are blue and the night skies brilliant with stars beyond any experience of our Anglo-Saxon people in their more ancient homes. In the summer there is a startling contrast between the temperature in the sun and that in any scrap of shade beside a wall or a tree. Extremes of temperature that would be distressing in more humid air are little noticed.



(Courtesy Municipal Facts)

MOUNT OF THE HOLY CROSS

The seasons also permit of some generalization. Although rainfall is pretty evenly distributed everywhere, it tends to reach higher in the months that would be called late spring and late summer in Eastern America. Spring, however, in its traditional English sense of a season of gradual awakening of nature, scarcely exists in Colorado. The European tradition or conception of the four seasons would never have originated here. In spite of occasional references to the four seasons in translations of ceremonies of the western Indian tribes, these natives do not naturally think in such terms. The opening of the calendar year arrives in Colorado usually in a season of clear and sunny skies, open weather. Occasional spells of searching cold which began to appear in late October continue into January. This is winter only in the sense that vegetation is dormant and the deciduous trees bare. There is none of the snow-bound gloom of the winters of literature. Even the passes of the higher mountains are often open to travel until the holidays. In March, April and even May, the main winter snowfall arrives. This is the unkindest season of the year. The mountains cloak themselves in clouds, and the snow accumulates often over the treetops in higher altitudes. On the plains, snow blizzards, and dust storms alternate with sunny days that trick men and even imported trees and plants into the belief that summer is just around the corner. The native trees like the box-elder and cottonwoods are seldom fooled into budding or leafing too early but immigrants like maples and lilacs are often nipped by frost or broken by snow after summer seems to them well under way. Suddenly some day in late April or May, summer actually arrives unannounced and in a week or two the trees are in broad leaf, the plains and mountain slopes are gorgeous with flowers and the smaller ground animals are abroad. There has been no spring.

This summer lasts until well into September. During June and July, the higher mountains become almost swamps under the streams from melting snowbanks, and the foot-hill cañons and prairie rivers overrun their banks. By the middle of July the snow is mostly gone, and the high passes over which the railroads and wagonroads clamber are open and past trouble. July and August are a period

of afternoon thunderstorms, when fleets of cumulous clouds sail eastward across the peaks and plains like white icebergs in an intense blue sky, and drench the country in streaks. The lower mountains and the prairies bake brown in the sun wherever the thunderstorms happen to miss them for a week or two.

In September comes the loveliest season of the year when the native Coloradoans, grateful for the departure of the summer tourists, make the most of their country. Early frosts release the yellow and crimson in the leaves of whole mountainsides of quaking aspen trees. There seem to be vertical miles of color, hanging like tapestries. The days are sunny, the nights have just a tang of frost that makes the campfire welcome. The sky is practically stormproof and usually even cloudless for weeks at a time. This sort of weather continues into the new year, more or less. Late in October, occasional snows arrive which the weakened sun cannot carry away and, as the calendar runs out, the weather is more fitful, and frosts become severe. There are few storms and little moisture, however, until March or April, as a usual rule. In short, Colorado has three seasons, an open, chilly winter during what is elsewhere spring, a summer that then lingers into what is autumn in the East and an autumn that stays until Christmas is well over.

The mountains and mountain ranges of Colorado must be studied from a map for any profit, and described by lines or shades rather than words, but even with a map before him, the inquirer will need some guiding. The main geographic features have already been outlined. The distinguishing features of the central Rocky Mountains are their immense mass and area, their high altitudes, their wide coniferous forests and their general hospitality to mankind. There are considerably higher mountains, of course, elsewhere in the world, and even as close as the Alaskan ranges that reach down into the Canadian Northwest. Most of the substantially higher mountains of the world are and doubtless will remain remote from European civilization, if only because of the snow and ice conditions which prevail there at much lower altitudes than in the Rockies. Of the mountains so accessible, the Alps of Switzerland, the Sierras and the Coast Ranges of Cali-

fornia, the Cascades of Washington and Oregon, the Canadian Rockies which reach into Northern Montana, the Appalachian Mountains of the Northeastern States, and the central Rocky Mountains are all mountain chains more or less settled by man and traveled by others than merely the hardy mountaineer. They are thus comparable. The highest peaks in the Rockies are substantially as high as any summits among these mountains. In the extent of its mountainous area and in the number of high mountains, of first order, the Rockies much exceed all the others named.

The Alps have about seventeen peaks or points which exceed 14,000 feet in altitude, with three above 15,000 feet, the highest being Mount Blanc, 15,782. As far as area occupied is concerned, Switzerland itself is about one-sixth the area of all Colorado, or about one-third of its mountain area. The Alps are much more encumbered by snow and ice than Colorado, as illustrated by the fact that trees seldom grow above 7,000 feet there, while in Colorado timber line often reaches as high as 12,500 feet and averages about 11,500. The Alps are generally more precipitous and spectacular from the view below than the Rockies, but some localities in the central Rockies, such as the Lizard Head, Longs Peak and the Arapahoe Peaks in Colorado and the Tetons in Wyoming produce as extreme cliffs and pinnacles as anything in Switzerland.

We turn next to American mountains for comparison. The Sierras in California have thirteen peaks over 14,000 feet altitude, one, namely Mount Whitney (14,501 feet), being the highest point in the United States. The California High Sierra is very similar in appearance and vegetation to the Rockies but is quite small in extent. The wall on the east side into the desert is one of the highest scarps in the world. The Cascades have one peak over 14,000 feet in altitude (Mount Rainier, 14,408 feet), which, as the greatest of this chain of isolated volcanoes, is, when it can be seen, one of the great mountain sights of the world. It rises out of a rain-forest, however, and the glories of this forest and the glaciers on its sides are smothered in mist and cloud most of the year.

None of the other mountain ranges named as those accessible to civilization have any peaks as high as those

just named. As against the seventeen in the Alps, and the thirteen in California and the one in Washington, or thirty-one mountains in all which exceed 14,000 feet above the sea in the ranges named above as being the accessible haunts of Europeans and Americans, Colorado alone has forty-seven peaks of this altitude. Mount Elbert, 14,420 feet, is the highest and near the center of the state. The other high peaks are widely scattered, though mostly placed in the center, south and southwest. Pikes Peak, 14,110 feet, is most celebrated, but there are twenty-five mountains in the state higher than it. Its fame—for it is no doubt the best known mountain in America—is due partly to the fact that it is connected in history with the gold rush of 1859, and partly due to the fact that it stands isolated from other high summits at the very edge of the plains above Colorado Springs and Manitou, the most visited resort towns in the Rockies. The "Pikes Peak Diggings," which were the foundation of modern Colorado, lie about seventy-five miles north of Pikes Peak, and to the west of Denver, among even higher mountains. Pikes Peak remains the most approachable and conspicuous of Colorado mountains, and the association with Lieutenant Pike's desperate and mysterious venture across the plains in 1806, leaves it outstanding in history. Cripple Creek, among the notable gold camps, was developed on its western slope in the '90s. Today the great mountain is domesticated by a cog railway and an automobile road which each year carry thousands of unadventurous tourists to its summit.

The high mountains conspicuous from Denver are probably known next best to Pikes Peak. Mount Evans, altitude 14,259, raises its great bulk thirty-five miles west of the city and is the head of a family of high summits, usually snow capped, that preside over the city. Farther back, and hidden by intervening ridges from most of the city, stand Grays Peak, altitude 14,441 feet, and Torreys Peak, altitude 14,336 feet, named for the botanists. The last two listed are the tallest mountains that are visible from the plains cities. Sixty miles northwesterly from Denver, so that it stands like a monument at the foot of the principal bank and office building street, rises Longs Peak, altitude 14,255 feet. Although a double peak from a view farther

north, it is seen from Denver as a sort of steep sided pyramid with a truncated top. It marks the location of the Rocky Mountain National Park. With its spectacular rise above the saw-toothed mountain wall, this summit is perhaps the most impressive of all the northern giants. While Mount Evans is already almost surmounted by an auto road and the climb of Grays and Torreys is simply a long struggle up rock-slides, the ascent of the precipices of Longs Peak is an essay in mountaineering. Too free familiarity has cost several lives already.

From Denver, Pikes Peak can be seen as a pale blue or white triangle seventy miles to the south, and the other peaks already named stand regimented with a multitude of lesser mountains across the whole western horizon. Beyond Longs Peak, the eye reaches almost to the Wyoming line. This view is one of the great mountain sensations of the world—no doubt the most impressive from any large city. These mountains looming over the city enter day by day into the words and activities of the residents, as the sea preoccupies a fishing village or Naples watches Vesuvius.

Little will be gained by an enumeration of all the ranges that constitute the Rocky Mountains. As already described, the belt breaks into a complicated series of parallel ridges and knots, sometimes widely separated by plateaus and valleys, and even the nomenclature for them is still unsettled. The Front or Snowy Range is the first main wall west of the plains, and is a fairly consistent ridge from the north boundary of the state to about the center. There it bursts into a starlike group of radiating ranges, such as the Vasquez, the Williams Fork, the Gore Ranges and other less clearly distinguished ridges, like the Mount Evans group, the Mosquito Range, and the Kenosha Hills. Following farther south, the trend of the highest peaks jogs westward, and the mountains divide into two parallel chains, separated by the upper Arkansas River, namely the Park and Sawatch mountains. The line of the main crest now drifts to the southeast and becomes the Sangre de Cristo Range, dividing the plains from the San Luis Valley. Far to the west the San Juan Mountains, as already mentioned, are a vast outlier. Many other groups and

chains diverge or stand as sentries beside these principal families of mountains. Until within the past fifteen years, many of the highest crests went by several names, or had no name at all, and even the names of the ranges, derived as they are only from the point of view of nearby lowland trade routes or settlements, bear little geographical system. Most of the earlier mountain names were attached to lesser shoulders or ridges which happen to be conspicuous from a settlement or to have mineral importance. Such points become negligible or indistinguishable from wider views or in the terms of broad geography.

Parenthetically, the place names of the State of Colorado are a curious index to its human history. In the southern half of the state the principal streams, towns and ranges bear Spanish names, such as San Juan and Durango and many others already mentioned. On top of these Spanish names, as it were, lies a thin stratum of names reminiscent of the days of the Indian and military frontier, with such tribal references as Ouray, Sawatch and Apishapa or forts named for commanders such as Garland. Then follows a series of mining terms, applied to such towns as Telluride, Silverton, Silver City, mostly in the higher mountains. The latest or upper layer historically as we can consider it, is a series of imported names brought by agricultural immigrants from the east, as, for example, Farmington, Lamar, Springfield and so on. The Spanish influence fades out as we move north through the state, and when we reach the center is replaced by a very sparse remnant of the language and names of the French trappers who came hunting beaver from the north a century ago. Fontaine qui Bouille (now usually Fountain Creek), St. Vrain and Cache la Poudre are stream names of this period. In the north half of the state, we find above the French period, the same sequence of Indian, and military and then mining and agricultural names as in the south. Recently the new place names—for there is much naming still to be done—have become more self-conscious, and we meet a host of historical and poetic references or efforts to recall departed periods, which time has now gilded with romance.

The land forms of Colorado have great variety but can be easily classified. The Plains area is almost wholly one

(Courtesy of the Denver & Rio Grande Western Railroad)

THE SANGRE DE CRISTO RANGE, SAN ISABEL NATIONAL FOREST
From Deweese Lake, near Westcliffe, Colorado.



of the gentle declivities, broad and almost indiscernible valleys and water divides which have resulted from the deposit of material eroded from the mountains and carried eastward by thin and shifting streams. Here and there the modern streams are carrying away layers of sand, clay or volcanic material which has become consolidated into soft rocks, and in such cases we find low buttes or table mountains, as east of Palmer Lake on the divide between the Platte and Arkansas waters, and sometimes the groups of little conical hills so like Indian tepees, that are familiar east of Pueblo. Usually, however, the plains have only the gentlest of slopes.

Turning to the mountains, we find two classes of highland. The first class represents the main Rocky Mountain ranges. The second we find in the more western outlying ranges. The first class of highland scenery is the characteristic result of ice and water erosion on the homogeneous masses of granite which make up the core of the Rockies. This rock under the gnawing of running water develops into a series of vast round domes which become the crests of the ranges. These domes are the primitive form of most of the principal mountains. In spite of their altitude, and the fact that tree growth stops perhaps 2,000 feet below the summits, such forms usually permit the visitor to climb to great altitudes by easy walking or even on horseback. Only distance and shortness of breath make any hardship in such exploration, but the distances are likely to be underestimated. Many a ten-mile slope looks like an hour's walk. In winter these slopes are wind-swept and blizzard haunted. In early summer they are swamped with melting snow. In late summer and fall they are gardens of dwarf flowers, the home of the ptarmigan, and coney and other interesting life, and are usually as hospitable and tenantable day and night as any garden.

Below the great domes of the main Rockies, the lower mountain slopes tend to become plateau-like, but only from the distant view. The traveler finds the detail to be a confusing mass of cañons, and rock summits. From headwaters in the main ranges run a series of parallel streams, which deepen into extreme gorges and cañons as they near the point of emergence from the mountains. These cañons

with spreading upper branches occur with almost algebraic regularity across the intermediate mountains and the foothill district that borders the main mountain crests.

While the mountains are essentially simply the product of running water on a great unlifted pudding of granite, another factor has entered somewhat into the sculpturing. Glacial ice, in several distinct periods, has accumulated heavily on the upper summits. Some of the mountains, such as Longs Peak and the Arikaree group, for example, have been so gouged and wrecked by glaciers that their dome form is scarcely discernible. They have become turrets surrounded by glacial cliffs, as in the case of Longs Peak, or two outlying "rabbit-ears" or fragments of a dome through the center of which a glacier has cut its way back, as in the case of Arapahoe Peak. On some domes, the ice has accomplished little, as on Mount Lincoln and Pikes Peak, or has gnawed only a single chasm or "cirque," to use the technical term, on the northeast slope of the dome, as on Mount Rosalie.

The same ice has altered the forms of the upper stream valleys. In the characteristic Rocky Mountain country, we find the creeks rising in great glacial amphitheatres on the slopes of the high mountains. Here there is usually a series of little round rock-bottomed lakes which the public like to call craters, and imagine to be bottomless. They are neither very deep nor do they bear any relation to volcanoes. They are the characteristic gouges of mountain glaciers. After tumbling through a series of these lakes, the stream usually travels through three elongated lakes or beaver meadows beginning below the tree line. These are formed by the terminal moraine of the glacier where it stopped in its slow recession for awhile and piled a dam of debris before its snout in three such pauses. These upper stretches of the valley are not the characteristic "V-shaped" forms made by running water but are "U" valleys—the product of a river of slow-moving ice, which ploughs a broad path between cliff walls. Farther down in their course from peak to plains, the streams usually travel next through a more open section, which is the site for upland ranches and the little middle-mountain villages. Below this in turn, the stream enters the foothill area and

buries itself in a gorge or canyon. In this last stretch before the creek escapes from the mountains, the ice has played no recent part, and the result is a bold and narrow knife-cut, through which the modern highway or railroad follows only at great cost. All the earlier explorers were subdued and even terrified by the gloom of these characteristic gorges. The journals of the explorers are full of such comment.

The four great "parks" of the central Rocky Mountains are famous and distinctive in their geography. These are North Park, Middle Park, South Park and the San Luis Valley. They are, as already indicated, four high plateaus between the roughly parallel ranges of the Rocky Mountains. They lie in a tier north and south across the state. There are numerous other open valleys or plains among the mountains called "parks." That term is universally applied to any unobstructed and level spot in this land of hills and forests, particularly to the larger glades in the woods or to the characteristic wide heads to valleys in the middle altitudes. The four great parks, and particularly South Park and the San Luis Valley, are, however, larger and unique. The San Luis has been described elsewhere in this chapter. South Park, next north of the San Luis Valley and near the center of the state, is an indefinite fifty by seventy miles area, and averages about 9,000 feet in altitude. Too high for much agriculture, it supports stock and sheep. Only one town, Fairplay, has developed into more than merely a station on the lines of narrow gauge railway that ramble across the great expanse. South Park is thus higher, smaller, less defined, and much less inhabited than its extraordinary sister to the south, San Luis. For a sense of exposure and nakedness on the roof of the world, Thibet must be the nearest rival to South Park. Yet in summer the park is as sunny and hospitable as it is desolate in winter. It is a favorite drive for Colorado motorists. Its older name, Bayou Salado, arose from a group of salt springs midway in the park.

The other main parks, North and Middle, lie still farther towards the Wyoming line. Middle Park is considerably lower than South Park, much broken by hills and stream channels, partly forested and pretty well settled. It is

about half the size of South Park and a third that of the San Luis Valley. Middle Park is the least distinctive of the four. Beyond it, at the Wyoming boundary, lies North Park, which is again like the two southerly parks, a sharply defined plateau between mountain walls. As in the case of the others, a railroad has straggled in, this time from the north. The little town of Walden sits near the center of a plain that is thirty by forty miles across, about 8,000 feet above the sea, almost level.

The foregoing paragraphs describe the typical conditions in the granite country which prevails through the main chain of the Rocky Mountains. Let us turn now to the second class of highland scenery, as contrasted with the granite dome region of the Rockies proper, just described. In the outlying ranges to the west, such as the San Juan Mountains, their subordinate member, the San Miguels, and the Elk and West Elk Mountains, we find a new class of mountain forms. Here the mountains, instead of being formed of homogeneous granite, consist of layers of sedimentary rocks or volcanic materials, usually fairly level like a layer cake but sometimes tipped or even contorted. Mountains of such origin do not weather into the great domes and rolling alpine pastures that prevail elsewhere, but form steep-sided tables, pyramids and obelisks, and varieties or combinations of such. Uncompahgre Peak (14,286 feet) is, for example, a combination of such forms. It rises over the surrounding mountains like the form of a crouching lion, carved like the lion of Lucerne from solid rock. The Lizard Head (13,156 feet), only recently climbed, is practically a pillar, and there are other precipitous turrets among the Needle Mountains. Even the streams take a different form among these mountains. Glaciation has occurred only at their very sources. The creeks tumble hastily down through heavy foliage and chasms of crumbling rock that bear little resemblance to the long bare gorges of the Atlantic slope. The scenery of such mountain country is much more suggestive of the traditional European ranges than is that of the main Rockies. The Alps, the Pyrenees and the Dolomites of Europe are just such crags and tumbled magnificence as the San Juan and the Elk Mountain districts, but contain

more snow and ice, are on a smaller scale, and are much less approachable. To the Swiss guide, the Rockies proper must seem vast, tame and undramatic, while to the Colorado mountaineer the Swiss Alps are amateur mountains, spectacular but small and artificial. In the more outlying ranges of Colorado, like the San Juan, San Miguel and Elk Mountains, the Swiss and the Coloradoan would find some common ground.

From the standpoint of a more intimate visit, the coniferous forests of the Rockies are a notable characteristic. Indeed a world voyager might differentiate this region of the West by that character. Deciduous trees are almost negligible. The quaking aspen, it is true, is a ready occupant of burned-over areas, and loves to cluster in its slim effeminate way wherever there is moisture and shade. The cottonwoods and their closer relatives line the foothill streams. Most of the other families familiar in the eastern hardwood forests are either represented by shrubs or missing entirely. The oaks, maples, and birches are shrubs. The characteristic high mountain view is one of pines and spruces, lying on the slopes like a carpet tumbled in a heap for mile upon mile.

The "timber," as mountaineers call the forests of the Rocky Mountain area, varies directly with altitude, running in bands across the rising slopes. The scant tree growth of the plains has already been described. Ascending above these into the mountains, we find first often a belt of scrub oak, trimming the hem of the mountain skirt. The foothill area, once the first slopes are well ascended, is nearly everywhere covered with yellow pine, a broad, long-needled, thick-barbed and rather dignified tree that is designed to resist drouth and ground fires. Still climbing, we enter the zones of other trees, finding lodge-pole pine in the form of dense thickets of slim trunks that make excellent tepee poles and so suggest its name. Engelmann spruce, in great dark forests, clothes the higher moister mountains. In the middle and lower mountains, the Colorado blue spruce, or silver spruce, the state tree, stands in solitary perfection along the water courses. It condescends to form groves but never makes a forest. As we get into the high altitudes, a belt of mixed spruce and fir is often found, hung

with grey moss, and sprinkled with orchids and coral mushrooms. Higher still, and normal tree growth gives way to mountainsides of dwarf trees, spruces and strange pines, that cringe in almost visible pain under the strain of surviving at the tree frontier. After climbing slowly through the aisles between these Danté-like forms of suffering, the climber emerges into the high pastures, with his feet sinking into dense grass and flowers and his eyes roaming past them to other open summits perhaps a hundred miles away. A glimpse of a herd of Big Horn sheep scrambling hurriedly out of sight; the whistle of a coney making hay-piles on the rocks; ptarmigan, who change their feathers with the season, fluttering up like pigeons; and an eagle beating along a cliff. These are the sensations of the high Rockies.

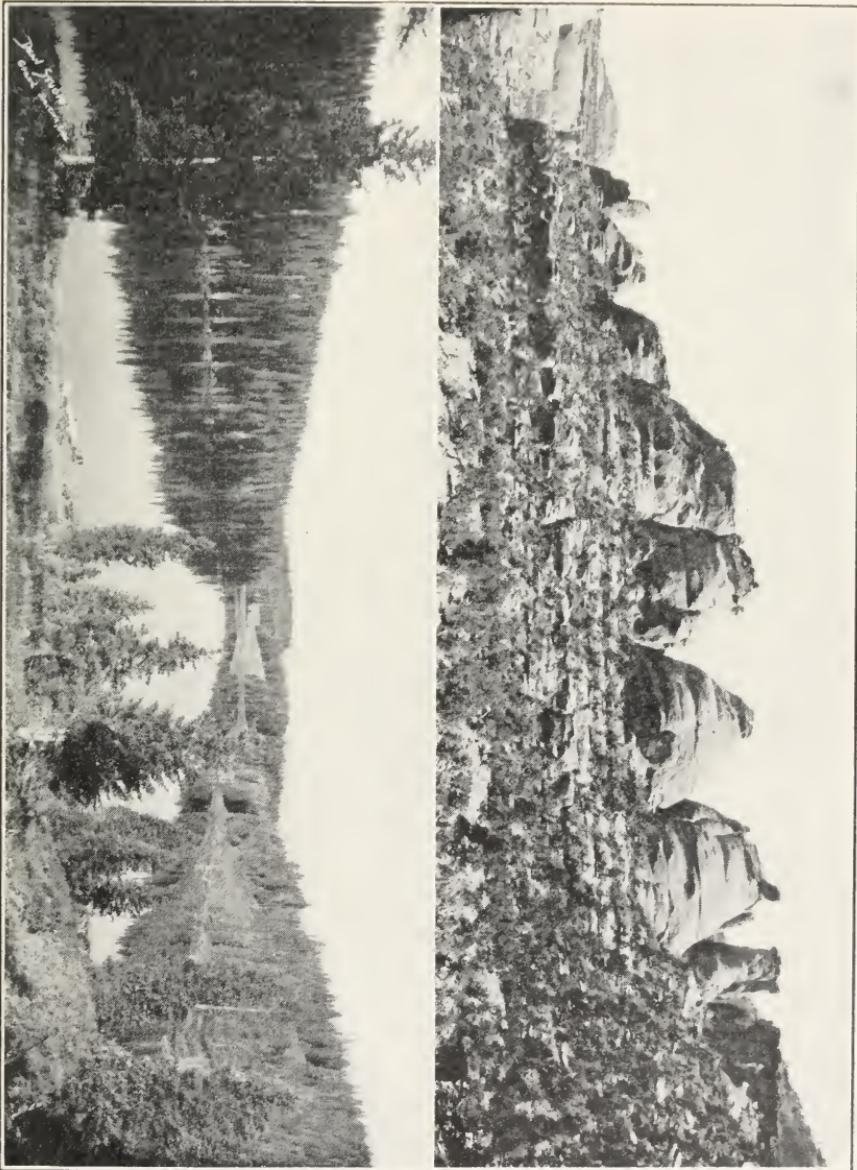
Out of this chapter of generalizations, some mountain localities remain for special mention. Few we shall mention have features notably different from the rest of the great mountain area. Most of them are singled out because they happen to be particularly accessible, and so have become more developed and better known.

The Pike's Peak district has already had our attention. Colorado Springs, as pleasant and beautiful a residence city as America possesses, and its suburb Manitou, a summer resort town in the lower hills, lie at the toes of the peak. The Garden of the Gods, which is a group of white and red rocks towering in a foothill glade, Ute Pass, South Cheyenne Cañon, and a number of charming mountain drives, notable hotels and similar entertainment for the visitor, have made this locality the largest and best known of the Colorado resorts.

The Estes Park-Grand Lake district, which since 1916 has been gradually shedding its earlier designations and is becoming known as the Rocky Mountain National Park, is the locality next most familiar to the tourist. Estes Park is a typical open plain or valley at the headwaters of Big Thompson and St. Vrain creeks, on the Atlantic slope of the Rockies in north central Colorado. Grand Lake is on the Pacific drainage, a large moraine lake already mentioned as being a source of the Colorado River. Between these lie a group of unusually ragged summits in the Con-

(Courtesy Denver Chamber of Commerce)

UPPER: "THE COKE OVENS," COLORADO NATIONAL MONUMENT
LOWER: ALEXANDER LAKE, GRAND MESA



tinental Divide. Longs Peak, the only notably high point, presides dramatically over the lesser summits. On the east slope, Estes Park is notable for its broad sweeps of foreground, its horseshoe of varied mountains on three sides and its suitability summer and winter as a headquarters for the idler. On the west, Grand Lake lies hidden among pine forests in a huge glacial valley. The Fall River auto road scrambles over the Continental Divide, between the park and the lake, at the limit of tree growth, furnishing a day full of breathless views for the traveller. This district of mountains is now a national park, and a refuge for game. Deer, elk, beaver, mountain sheep and many smaller animals are common. In the Estes Valley are a score of hotels, ranging from extravagant mansions to summer inns and naturalistic lodges, such as the camp of the late outdoor publicist, Enos A. Mills. About Grand Lake, private cottages prevail. A river of summer tourists flows through these settlements in summer, but only a few of the visitors penetrate farther to the canyons, glens and mountain lakes beside perpetual snow that fringe around the villages and gravelled roads. The region is a fine specimen of the central Rocky Mountains.

The narrative could lead easily into a sketch of many more widely known resorts and an indefinite number of other localities quite as interesting and spectacular but less developed and less known. But map and photograph are necessary to convey any useful information and descriptive words born in the scenes of distant and diminutive England seem unadapted to these alien and massive inland mountains. One or two regions more must be mentioned because of their familiarity. West of Denver the city has laced the mountains with loops of mountain boulevards, reaching now almost to the crest of Mount Evans, and opening the old mining districts at the head of Clear Creek. Here, through a succession of municipal parks, pavilions and resort towns the motorist can ride for days. Here a great population in the summer months escapes from the prairie states and camps and keeps house in cabins along the roadsides. Here, when the visitors are home at work in the remainder of the year, metropolitan Denver pours its Sunday torrent of holiday seekers. Between the Denver

park region and Estes Park is the Boulder County district, with Arapahoe Peak as its most conspicuous summit. On the northeast edge of this mountain lies Arapahoe Glacier, the southernmost living glacier in the Rocky Mountains. Lacking such financial support as Denver can provide for its own locality, this region remains now less accessible by road and less popularized than the mountains farther north or south. Southwest of Denver, again, is the water shed of the Platte River and its branches. This has been a territory of family cottages and fishing resorts for a generation. Recently fine roads have turned it open to the summerer from the Mississippi Valley states.

No list, no description would be valid long. Driven before the tribes of much-sought but overwhelming tourists, the residents of Colorado are wheeling farther and higher into the hills for their out-of-door life, as the nomad Indians a century ago were driven west by like pressure. The day is already exposed on the calendar when the Elk Mountains and the San Juans, which still remain remote, will have no secrets to the July cottager.

Mesa Verde National Park, in the farthest southwest corner of the state, is recording a doubling tide of visitors. Here, a high walled mesa stands in the open country to the south of the snowy La Plata Mountains. It overlooks the tinted desert to the southwest. A series of abrupt cañons from the Mancos River have been trenched back into this plateau—the Mesa Verde or “Green Table Mountain”—so named for the forest of pinons and cedars that grows dense as an orchard on its top. In these cañons, clinging usually like swallow nests just under the lip of the terrific cliffs, are the deserted towers and towns of the cliff dwellers. There is no ghostlier silence in the world than the stillness in which these white walls stare across the vast and sudden gaps and cañons in this distant tableland. No globe trotter can claim he has worn out the sensations of travel until he has gazed into these haunted places. No other group of American Indian ruins has the interest of the Mesa Verde.

Nearer to the populous states, the route of the Rio Grande Western Railroad threads some favorite resorts. The Canon City neighborhood has a variety of points to

visit. The notable Royal Gorge (a cañon traversed by the railroad and the Arkansas River) is best advertised. Canon City itself is one of the older frontier towns, at the feet of the convulsive mountains beside a noisy river in a garden of old trees and orchards. It is far enough south to be a winter resort. Farther west, over the mountains, Glenwood Springs, on the same railroad, won years ago its name as a beautiful resort for fashion.

Space forbids further mention. The resorts of the Rockies are a moving picture today and nothing said or omitted here would have significance long. Twenty years ago mountaineering was the foible of a casual enthusiast in Colorado. There were few tolerable mountain hotels, few persons were concerned with mountain geography, nomenclature or outdoor natural history. Colorado residents cultivated some private ranches or supported summer hotels along the railroads. The miner and the mining engineer, with their eyes on dollars underground, were the chief explorers, and they scorned as impractical any other interest in the highlands. Today the Colorado Mountain Club, a considerable institution, with branches in the chief towns and a family of associated outdoor organizations, keeps every kind of outdoor activity revolving. The automobile takes campers and picnickers over roads that the loggers and the ore wagons had already given back to nature in the '90s. There are scores of little mountain inns and camps, particularly on the eastern slope of the Snowy Range. The more accessible and lower mountains are overrun with the uninquiring, but the remoter and higher places are everywhere tracked by the trumper and the nature student. Skiing and snowshoeing in winter are now established and organized. A literature on mountain romance, exploration, botany, geology, natural history and so on is well under way. Mountain names, altitudes, trails, trees, flowers are eagerly discussed. Even the discomfited frontiersman, however, has hold of one comfort. Neither he nor his sons will live to see these vast mountains tamed as the Swiss Alps have already been tamed for nearly a century.

CHAPTER IV

NATURAL HISTORY

By T. D. A. Cockerell

CHARACTERS OF COLORADO BIOTA—PAST INVESTIGATIONS — MAMMALS — BIRDS — REPTILES — AMPHIBIANS—FISHES—MOLLUSCS—ARTHROPODS—LOWER INVERTEBRATES—FLOWERING PLANTS—FERNS AND THEIR RELATIVES—LOWER FLOWERLESS PLANTS.

CHARACTERS OF THE COLORADO BIOTA

The central position of Colorado in the Rocky Mountain region gives it a wonderfully diversified fauna and flora. Northern species, some of them identical with those of Europe and Asia, may be found upon our peaks and in our shaded valleys. Eastern species come in considerable numbers at least as far as our foothills, and tend to increase in cultivated areas. Desert types from the arid south and southwest are numerous in some of our counties adjacent to Texas and New Mexico. Representatives of the life of the Great Basin are common on the western slope. Finally, there is a certain proportion of Endemics, that is to say plants or animals which have taken on special characters within our boundaries, and cannot be found anywhere else in the world, or possibly have spread to a limited extent into neighboring States. In addition to all these, we find some species, like the so-called Russian Thistle, which are not of American origin, but have been brought from other continents by man.

Not only is Colorado thus richly endowed with varied forms of life, but in its rocks may be found many thousands of fossils, testifying to the fact that for uncounted millions of years this has been a centre of vital activity. From these fossils we learn that at one time a large part of what is now Colorado was under the sea. Marine fishes and

molluscs have left their remains, which may be found by any one who cares to look for them. We also observe that formerly the climate must have been warmer, permitting the growth of palms and other forms of vegetation suggesting subtropical conditions. Thus the historic element enters into our consideration of existing life, and we ask how it came to be what it is, finding at least a partial answer in the rocks.

Few people realize how much that is new may still be found in Colorado. When we say new, we mean here new to science, previously undiscovered and undescribed. In the whole history of biological science, probably the most active years were those immediately before the great war. For a century past, there had been continually accelerated progress, and each year saw a greater output of published results. The war cut down production by at least one-half, and we have not yet returned to the pre-war level. A catalogue has been published of the animals and plants described as new from Colorado in the years 1912, 1913 and 1914, the last years of maximum productivity. During that period there were published as supposedly previously undescribed ten mammals (9 living, 1 fossil), two birds, one reptile (fossil), 606 insects (321 living, 285 fossil), 26 invertebrates other than insects (21 living, 5 fossil), and 73 plants (69 living, 4 fossil). This list includes many varieties, not ranking as distinct species, and it is certain that not all the species proposed are valid, but at the very least it shows clearly enough the abundance of life, past and present, within the area of the State. There may come a time when our animals and plants are all known, at least in the sense of having been described and named, but it will not be within the lives of the great-grandchildren of any now living. For an indefinite period, Colorado will be a place for discoveries, and the great problem will be, not that of obtaining materials, but rather of getting them properly studied and the results made public. To know our own country is perhaps our first intellectual obligation; may we meet it in the manner which clearly lies within our power, given only the will.

In a region of lofty mountains and deep valleys or canyons, an ordinary map, occupying two dimensions of space,

conveys only a poor idea of the topography. Extremely diverse conditions exist within short distances, and precision in designating localities is not always easy to attain. Many years ago a circular was published in Washington, calling attention to the importance of accurately stating the localities of insects collected. Formerly the collector used only a state label, but modern science requires precision, and in every case the name of the nearest post office should be given as the locality. This would indeed serve most purposes in Ohio or New York, but in Colorado it would be extremely misleading. With us, the region nearest to a given post office may include altitudes varying through many thousand feet, and otherwise quite diverse. Sometimes we find that the spot we wish to designate has no name on any map, and in Western Colorado there are large areas which have not been accurately mapped in detail. Thus it appears that in order to fully and accurately describe the natural history of our mountains, we must do intensive work on the spot, closely observing the distribution and habits of each species. When this is done, we may reason about causes and effects, but this cannot be done in any satisfactory manner by workers in museums, who have only miscellaneous specimens gathered at various times and places within the State.

As a sort of background for all our studies, we have to consider the Life Zones, whereby the country is divided up into biological instead of political regions. It is convenient to catalogue the fauna and flora (collectively called biota) of a state, county, or township, but such units are frequently unnatural in the sense that their products are far from uniform. Boulder County, with an area of 751 square miles, is really a section of the front range, extending from the plains to over 14,000 feet at its western boundary. It would be difficult to make any description applicable to the whole of this area. To the naturalist, such conditions present a wonderful opportunity. In half a day, he passes through a succession of different climates and environments, each with its characteristic forms of life. He can observe the limitations imposed on the spread of plants and animals, the struggle with the environment, the competition between different organisms. He can see the result

of nature's long time experiment, in her laboratory of the wilds. But in order to do this, he has to know what he is looking at; he must be able to recognize many genera and species, and know something about their relationships and mode of life. He cannot attain any biologic virtue if he is like the young woman who explained that she really didn't know anything about insects, but had the nature study attitude.

The Life Zones in Colorado are as follows:¹

(1) Arctic-Alpine, the region above timber-line on our mountains, characterized by the absence of trees, and the presence of very numerous small plants with extraordinarily brilliant flowers. Because of their small size and compact foliage, these are often mistakenly called flowering mosses. Where, in any country, can you find more brilliant blue than that of the little forget-me-not-like *Eritrichium argenteum*? Close to it is the delicate pink *Silene acaulis* or moss campion, also found in Greenland and the northern parts of Europe and Asia. Another pink blossom is that of the dwarf *Primula angustifolia*, a veritable primrose in the old English sense. The white flowers of mountain avens, *Dryas octopetala*, common on our high peaks, may be seen in arctic and alpine situations in the Old World. Hayden's paint-brush (*Castilleja haydeni*), with tufts of deep pink flowers, is confined to the Rocky Mountains at very high altitudes. The fauna of these alpine heights is not so conspicuous, but it includes the mountain sheep, which descends to the valleys during the colder part of the year, and now that it is protected, may often be seen in the vicinity of Estes Park. The cry of the pika (*Ochotona saxatilis*) may often be heard among the rocks. It is a little animal allied to the rabbit, but with short round ears and no tail. If we are fortunate, we may see the Ptarmigan (*Lagopus leucurus*), white in winter and mottled brown in summer, in each case harmonizing with the environment. It is, of course, a close relative of the

¹ For additional details see Merritt Cary, *North American Fauna*, No. 33, published by the U. S. Department of Agriculture in 1911.

grouse. Brownish orange butterflies, flitting rapidly about, are likely to be Mead's sulphur (*Eurytus meadi*).

(2) Hudsonian, so called because it is well developed in the vicinity of Hudson Bay. This is the zone of "black timber," the trees being principally Engelmann Spruce (*Picea engelmanni*). In some localities the foxtail pine or bristle-cone pine (*Pinus aristata*) occupies much of the ground, and it is common to find good stands of the balsam fir (*Abies lasiocarpa*). Willows and dwarf birches abound along the streams, and many beautiful flowers appear in open spaces. There is no mammal entirely confined to the Hudsonian, but many species occur regularly. We may expect to see chipmunks, Fremont squirrels, woodchucks and weasels, but the bears and mountain lions know how to keep out of the way. Perhaps the most conspicuous bird is the white-headed jay or camp-robber (*Perisoreus canadensis capitalis*), that rascally fellow who makes himself so familiar about camps, carrying off whatever food is not closely watched. The interesting little brown creeper (*Certhia familiaris montana*) breeds in this zone, and may be seen on the trunks of trees, behaving like a woodpecker.

(3) Canadian, with mixed, more open, vegetation, in which the aspen is conspicuous, turning yellow or orange in the fall. An important conifer is the lodgepole pine (*Pinus murryana*) with relatively short cones. The blue columbine (*Aquilegia caerulea*), the state flower of Colorado, may often be found in abundance. In the Roan Mountains it is replaced by a white variety, the flowers appearing like white stars against the dark green background of shrubbery. Mammals and birds are abundant, and insect life is remarkable for its variety. Beautiful silver-spot butterflies (*Argynnис*) are represented by several species, their caterpillars feeding on wild violets. This zone may be said to roughly include altitudes from about 8,000 to 10,000 feet above sea level, but it varies greatly with exposure, and according to the latitude. In Southwestern Colorado, where there is a southwestern exposure, it may go up to about 11,000 feet.

(4) Transition, extending along the foothills, and into the mountain parks; a relatively dry region, mostly with sparse or open vegetation, though there may be very dense

shrubbery where water comes near the surface. The characteristic conifer is the Rock pine or yellow pine, *Pinus scopulorum*. The Douglas fir (*Pseudotsuga mucronata*), the cones hanging downward, is very common. The mountain maple (*Acer glabrum*) is a handsome shrubby species, the leaves often spotted with bright red, due to the work of a mite. This is the zone in which (as the name suggests) we pass from the Boreal or northern biota to the Austral or southern. Hence we find what are called tension lines, where the two types of life meet, and invade each other's territory with varying success. Our Transition is that of the arid region, and has been called the Coloradian Area, to distinguish it from the Alleghanian or moist Transition of the eastern States, and the very wet Columbian area of the extreme Northwest.

(5) Upper Austral, our (arid) part of which is called the Upper Sonoran. This includes the lower altitudes, especially out on the plains, comprising according to Cary about 50,000 square miles. Its upper limit varies from about 5,000 feet to over 7,000 feet according to circumstances. It is impossible to define it exactly, because it grades gradually into the Transition, but it may be said to include the plains east of the foothills. The Western Cottonwood (*Populus sargentii*) is a conspicuous tree in the vicinity of water courses. The antelope (*Antilocapra americana*) and prairie dog (*Cynomys ludovicianus*) are characteristic mammals. Coyotes and badgers are common, and there are vast numbers of jack rabbits. The burrowing owl is often seen in the vicinity of prairie dog towns. There are many reptiles, including rattlesnakes.

PAST INVESTIGATIONS

As the early exploration of Colorado is fully discussed elsewhere in this work, it remains only to call attention to the progress in the study of the animals and plants. Professor W. W. Cooke, in his *Birds of Colorado* (1897) gave an exhaustive bibliography and history of the subject. The first mention of Colorado birds was that of Pike in 1807. Reference was made to the raven, turkey, magpie and "pheasant." The pheasant was of course not the Old World



THE STATE FLOWER OF COLORADO, BLUE COLUMBINE
Aquilegia caerulea (D. M. Andrews photo)

bird recently introduced, and now common, but was evidently the dusky grouse. Pike was not a naturalist, and it remained for Thomas Say (1823) to give us the first scientific account of Colorado birds, as well as many other animals. Say accompanied Long's expedition, and made good use of his opportunities. The botanist of the same expedition, Edwin James, had the great pleasure of discovering and making known the splendid blue columbine, now the State flower. Long's party went up the South Platte to the region of the present City of Denver, and thence south into New Mexico. Fremont's expeditions (1842, 1843, 1845) resulted in the discovery of some hitherto unknown species. Thus we have the common and attractive Fremont's squirrel (*Sciurus fremonti*) of our mountains, collected by Fremont's party, but not published until 1853. Fremont's aster and Fremont's geranium are well-known flowers. The one-leaved pinyon of the western slope was named by Torrey and Fremont. In 1846 Dr. A. Wislizenus made his journey into New Mexico, just missing Colorado, but discovering some of the striking plants now known to occur in our State. The branching cactus, *Opuntia arborescens*, was found near Wagon Mound, but is common in Southeastern Colorado. A fine cottonwood is named *Populus wislizenii*. Gunnison's expedition of 1853 is always to be remembered by the name of our common mariposa lily, *Calochortus gunnisoni*. There is also the mountain prairie-dog, *Cynomys gunnisoni* of Baird. The reports of the Hayden Survey contain a great amount of information about the fauna and flora of Colorado, recent and fossil. Officially, the survey was called the United States Geological and Geographical Survey of the Territories. The first report appeared in 1867, but Scudder's great memoir on the fossil insects of Florissant bears the date 1890. It was the custom during the middle decades of the last century to publish large reports on government surveys, including a great deal of matter collected from various sources other than the actual surveys. This latitude of treatment might have been criticized as exceeding the original instructions, but it certainly did a great deal to develop our knowledge of American natural history. F. V. Hayden, and many illustrious men who coöperated

with him, can never be forgotten by those interested in our animals, plants or fossils.

Although we owe so much to government surveys and the work resulting from them, many important discoveries were made by private individuals, visiting the state. One of the most noteworthy of these was Dr. Charles C. Parry. Born in Worcestershire, England, in 1823, he came to America in 1832, and in 1861 began his systematic explorations of the Colorado mountains, for the purpose of investigating the plants. This work was done at his own expense. He was delighted when he first became acquainted with the Colorado alpine flora, and never ceased to enjoy its many marvels. The magnificent Parry's primrose (*Primula parryi* of Asa Gray) recalls his name as we wander along the banks of alpine streams; while overhead towers the stately Engelmann spruce (*Picea engelmanni* of Parry), named by Parry after his friend, Dr. George Engelmann, another prominent student of our flora.

Others came to Colorado to collect insects, particularly butterflies and moths, subsequently selling them to specialists and amateurs. Sets of plants have also frequently been collected for sale. These operations take on a commercial aspect, but they have frequently proved of the utmost benefit to science. Wallace could never have visited the Amazon or the Malay archipelago, had he not found a market for his collections. Two collectors, H. K. Morrison and David Bruce, were the discoverers of very many Colorado Lepidoptera, including some of our most beautiful butterflies and moths. Unfortunately they did not as a rule preserve exact data with their specimens, and it has remained for later generations to discover the habitats of many species recorded from "Colorado." Morrison is perhaps best remembered by the large yellow bumble-bee (*Bombus morrisoni* of Cresson), so common in Colorado. The Reports of the Wheeler Survey, on collections made in portions of Colorado, Utah, New Mexico and Arizona during the years 1871 to 1874, added much to our knowledge. In this series W. H. Edwards gave a list of the butterflies, with field notes by an excellent observer, Theodore L. Mead. The latter is commemorated by *Eurytus meadii*, a common butterfly of our highest peaks.

Eventually there came a time when resident collectors and students took up the work, usually handicapped by lack of books and specimens for comparison. In 1888 a society was formed, called the Colorado Biological Association, with headquarters at Westcliffe. Its membership was never large, but it included the working naturalists then resident in Colorado, as well as several distinguished specialists outside the state, who gave their cordial coöperation. It is interesting, today, to go over the list. There was H. W. Nash, of Pueblo, a keen student of butterflies, who supplied material for the classic researches of W. H. Edwards. Charles F. Morrison, who had paid much attention to the birds of Colorado, and published (1888-1890) a State list. He added six birds to the known Colorado fauna. Mrs. M. E. Cusack, who published nothing, but made a large collection of plants, now in the Kew herbarium. Horace G. Smith, interested in general natural history, and still living in Denver. W. S. Foster of Salida, collecting Lepidoptera. Denis Gale of Gold Hill, well known for his excellent work on mammals and birds, concerning which see Henderson, *University of Colorado Studies*, 1907. He discovered two new mammals, one of which, a red-backed mouse, was named after him. Willoughby P. Lowe, then living at Pueblo, an excellent ornithologist. Alice Eastwood, then teaching in Denver, an enthusiastic botanist, since well known by her important researches, and now at the California Academy of Sciences in Golden Gate Park, San Francisco. The present writer, then a very young man, living at Westcliffe, now resident at Boulder. The little four-page reports, reprinted from the *Custer County Courant*, were of slight consequence. A much more serious production, cataloguing the Hymenoptera of Colorado and describing many new species, was published in 1890. This was written by W. H. Ashmead, who bore all the cost of the publication.

The modern period, between 1890 and the present day, is distinguished by the growth of universities and colleges, and the centering of biological research in these institutions. Twenty years ago, in 1905, I wrote an article in the *Popular Science Monthly*, on *Biology in the Rocky Mountains*. At that time I remarked: "Any one who examines

the published accounts of Rocky Mountain animals and plants will find, at least in the majority of groups, little more than descriptions of species. Putting aside the enormous number of species still undescribed, we find that the 'known' species are in fact very little known at all. Among the insects, for instance, there are hundreds of which we do not even know the locality, nearer than the name of the state, and those of which we know the life history are comparatively few. The details of geographical distribution, the character and extent of the variations, the inter-relations with other species—these are things rarely mentioned in accounts of species described from our area." It must be said that even today we are hardly more than on the threshold of adequate knowledge of our biota. Yet in the last quarter of a century great progress has been made. E. R. Warren of Colorado Springs, beginning with a small collection which could be shown on an ordinary tray, built up a splendid series of Colorado mammals, which required a special building for their reception. In 1910 he published his admirable and beautifully illustrated *Mammals of Colorado*, certainly one of the best books of this type which has appeared anywhere. W. L. Sclater, coming from South Africa and now living in England, was for a time at Colorado College, and there prepared the monumental *History of the Birds of Colorado* (1912), with 576 pages. It was primarily based on the collection of the veteran ornithologist of Colorado Springs, Charles E. Aiken, which had been purchased for the Colorado College Museum. Illustrated accounts of the *Amphibia and Reptilia of Colorado* (1913), by Max M. Ellis and Junius Henderson, and the *Fishes of Colorado* (1914), by Max M. Ellis, have been published by the University of Colorado. Existing knowledge of the mollusca of Colorado, Utah, Montana, Idaho and Wyoming has been fully summarized by Junius Henderson in *University of Colorado Studies*, 1924. Many species have been discovered or added to our fauna by him, the latest being a fresh water limpet (*Ancylus hendersoni*), discovered in Lake Eldora. The papers on insects, living and fossil, are too numerous and varied to be mentioned, but we should not forget the catalogue of the Coleoptera (beetles) of Colorado, by H. F. Wickham, of Iowa, published in 1902.

Prof. C. P. Gillette, of the Agricultural College, has closely studied the Aphides or plant lice, revealing a multitude of previously unknown forms. The flowering plants and ferns have been treated at length by P. A. Rydberg of the New York Botanical Garden (*Flora of Colorado*, and *Flora of the Rocky Mountains and Adjacent Plains*), and by Aven Nelson of the University of Wyoming (*New Manual of Botany of the Central Rocky Mountains*, 1909). Doctor and Mrs. Clements have published a book on Colorado wild flowers, with excellent colored plates, which make the recognition of the commoner species quite easy.

Ellsworth Bethel of Denver took up the study of the rust fungi, and was able to show the remarkable richness of Colorado in these parasites. He also interested himself in many other forms of life, discovering hitherto unknown snails, gall-insects, etc. The botanical collections he accumulated, now in the State Museum, will prove of great value to students in future years. In addition to all these activities, the work of the Colorado Museum of Natural History and of the Zoological Garden in Denver have done much to interest people in our animals and plants. The work on fossil mammals by the Colorado Museum has been briefly described in *Scientific Monthly*, September, 1923.

The next twenty years should see much greater progress, though this will only be possible if reasonable facilities are afforded to workers in Colorado. In particular, it must be made possible to publish the results of investigations, both in technical and popularized form. There is no good reason why we should not shoulder our own burden in this respect, instead of being dependent on museums and societies in other States. It is worth our while, not only to afford every facility for competent students of the fauna and flora who live in Colorado, but also to do all we can to induce specialists to visit us from time to time, and give us the benefits of their expert labors. Then, eventually, it will be possible to produce, through coöperation, a comprehensive Biota of Colorado, with descriptions and illustrations. It may also be possible to publish a Natural History Guide Book, describing the geology, plants and animals of various localities. In those happy days, the intelligent

appreciation of nature, by residents and tourists alike, may be increased an hundredfold.

MAMMALS

The Mammals, or four-footed, warm-blooded, hairy animals, are well represented in Colorado. Yet not nearly so well represented as formerly, for we know from numerous fossil bones that in past years large animals were as abundant here as they now are in Central Africa. We cannot escape a certain feeling of regret that we are too late to see the mammoth wandering in our mountain parks, or admire such relatives of the camel as may still be found in the Andes. Nevertheless, we can enjoy the spectacle of flocks of mountain sheep (*Ovis canadensis*), now fairly tame, being protected by law. The bison was abundant within the memory of men still living, but human "civilization" was too much for it. The last survivors held out for a time in Park County. Recent measures have been taken elsewhere to preserve the species from utter extinction, and there is no reason why it should not once more become a familiar object in suitable localities. The great herds of the plains can never be restored, so long as civilized man occupies the country. The American antelope (*Antilocapra americana*) has fared better, and may still be seen in a wild state. It is a beautiful animal, and should be protected by every citizen. The automobile now takes multitudes of people all over our plains country, and the temptation to shoot an antelope is too great for some to resist. They must be given to understand that these animals are the property of the State and are no more to be destroyed than the farmer's cows. The majority, no doubt, will respond suitably if the matter is properly presented to them. Warren, writing in 1910, thought the antelopes were actually on the increase, as the result of protective legislation. The Wapiti or American elk (*Cervus canadensis*) was once a common animal, and on the Pacific slope provided food for the population during the winter months. But men began to destroy it for the horns and hides, and now it is rare and scattered. Animals have been brought from Wyoming, to reestablish the herds, and there are indications that with

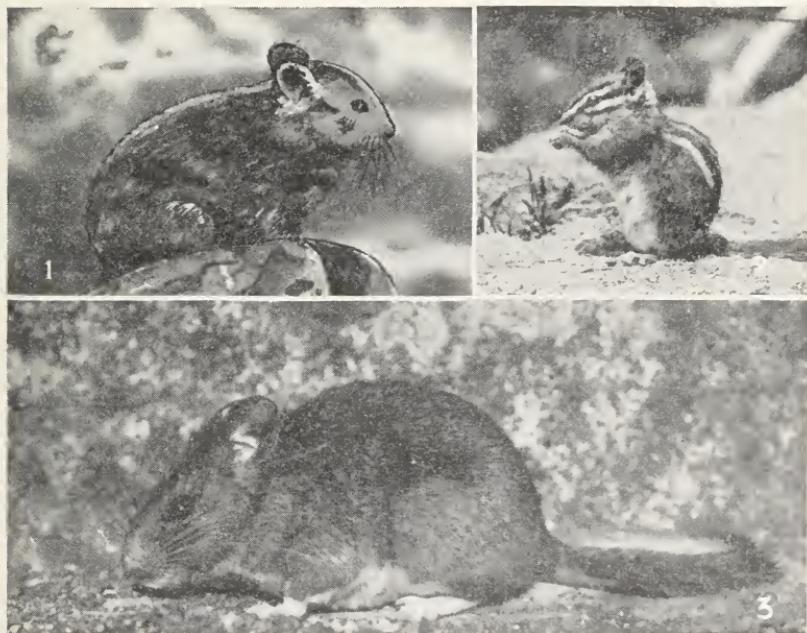
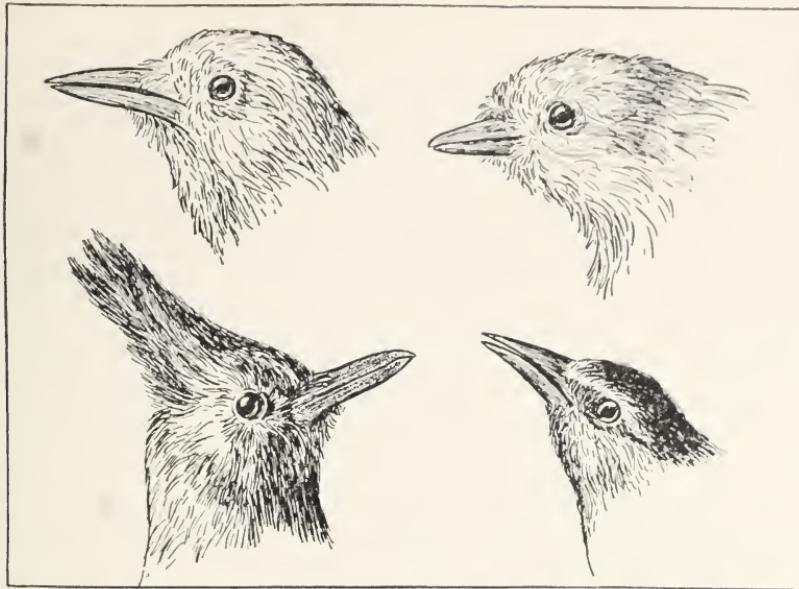
protection the elk will once more abound. The Rocky Mountain Black-tailed deer or Mule deer, and the White-tailed deer (species of *Odocoileus*) are native animals belonging to an American genus. It is the elk which is really a close relative of the red deer of Europe. The mule deer (so called because of its large ears) is still very common. In the vicinity of Estes Park there sometimes arises a complaint that these animals break into cultivated fields, and do a lot of damage. No doubt, with the protection afforded, and the destruction of the larger carnivores, these deer will increase perhaps beyond the numbers of prehistoric times, and it will be necessary to fence securely against them. What measures are desirable to keep them in check is a matter for discussion, but it seems to me that the present brief open season has little to recommend it. It is hardly good "sport" to go out and slaughter animals which have become so tame that they will stand near the road and gaze at passing automobiles; but, pursued, lope gracefully but not too hurriedly to cover among the aspens.

The Colorado carnivores are quite numerous, including the otter, weasels, mink, marten, wolverine, skunks, badger, raccoon, bears, coyotes, gray, red and swift foxes, gray wolf, mountain lion and lynxes or bobcats. The bears are usually considered to be of two sorts, the large and fierce grizzly, and the small, relatively mild and harmless black bear. The cinnamon bear, separated by some as a distinct animal, is merely a brown phase or variety of the black bear. Dr. C. H. Merriam, working principally with skulls, has divided the American grizzlies into a large number of supposed species, of which four inhabited Colorado. These animals are now so rare that adequate information about them can hardly be obtained, but whenever possible skulls should be saved, even if old and worn. The black bear is still frequently found, and is often captured, making an attractive pet.

The Gray wolf (*Canis nubilus*) was made known in 1823 by Thomas Say, who obtained it on Long's Expedition. It is a widespread animal which is seldom seen, but is seriously destructive to stock. Human beings are not attacked. A more familiar animal is the coyote, recognized by its peculiar cry, which may often be heard at night,

even in the vicinity of towns. According to Doctor Merriam, there are several species of these coyotes, but they are very much alike, and even the trained naturalist is often at a loss to distinguish them. The Red fox is a mountain animal; it is related to the species which is hunted in England. It presents occasional color variations, the cross, silver and black foxes being merely peculiarly colored individuals of the red fox. The silver fox skins, in particular, have a high commercial value, and as a result efforts are being made to breed them, taking advantage of the principles of heredity made known by Mendel. There appears to be no reason why the most desirable skins should not be produced in abundance, with, of course, a corresponding drop in price. The Swift fox (*Vulpes velox*) is a much smaller animal, found on the plains. The Gray fox is uncommon, occurring at lower elevations, as far north as the vicinity of Boulder, where it was taken by Alfred A. Greenman, Jr. The Colorado animal is not the Eastern gray fox, but the Southwestern race described as *Urocyon cinereo-argenteus scotti*, first found in Arizona. The Mountain lion (*Felis hippolestes*) is a large and formidable looking animal, but retiring in the presence of man, and not dangerous. The writer, who has spent about a quarter of a century in Colorado, has never seen one at large. It is of course destructive to horses, elk and deer, and so is regarded as a serious pest. We have three kinds of lynx, the Canada lynx of the mountains, and the Mountain and Bailey bobcats. It is not unusual to come across one of them in hilly or mountain country. The common skunk (*Mephitis mesomelas varians*) is an example of "warning coloration"; that is to say, its conspicuous black and white colors make it easily recognized, and thus avoided by those animals aware of its peculiar properties.

The English naturalist, A. R. Wallace, relates the following incident: "While staying a few days, in July, 1887, at the Summit Hotel, I strolled out one evening after dinner, and on the road, not fifty yards from the house, I saw a pretty little white and black animal with a bushy tail coming towards me. As it came on at a slow pace and without any fear, although it evidently saw me, I thought at first it must be some tame creature, when it suddenly occurred



COLORADO BIRDS (Drawn by Evelyn Moore)

Upper: Clarke's Nutcracker and the Rocky Mountain Jay
 Lower: Long Crested Jay and Bullock's Oriole

COLORADO RODENTS (Photographs by E. R. Warren)

Below: 1. Cony or Pika (*Ochotona saxatilis figginsi*). 2. Colorado Chipmunk. 3. Mountain or Colorado Bushy Tailed Rat (*Neotoma cinerea orolestes*)

to me that it was a skunk. It came on till within five or six yards of me, then quickly climbed over a dwarf wall and disappeared under a small outhouse, in search of chickens, as the landlord afterwards told me * * *. Its consciousness that it needs only to be seen to be avoided gives it that slowness of motion and fearlessness of aspect which are, as we shall see, characteristic of most creatures so protected." (*Darwinism*, p. 233.)

The smaller mammals include the bats, shrews, moles and rodents, the last being excessively numerous. Some would remove the rabbits and pikas from the order Rodentia, on account of their many distinctive characters. The pikas (*Ochotona*) are pretty little animals with short rounded ears and no tail, found among rocks above timber line. The rabbits are divided into the jack rabbits and cotton tails, but there is also the snowshoe rabbit of the high mountains (*Lepus bairdi* of Hayden), which has large hind feet, and turns white in winter. It is interesting to note that this animal and its enemy the Canada lynx, both inhabitants of the high mountains, have feet adapted for running on snow without sinking in. The jack rabbits have become so abundant and destructive on the plains that steps have been taken to destroy them, and great hunts have been organized. The cotton tails are not all alike, five different kinds being recognized. One of these (*Sylvilagus auduboni warreni*) was originally discovered in Montrose County, Colorado.

The true or typical rodents include the porcupine, beaver, squirrels, prairie dogs, spermophiles, gophers, chipmunks, woodchucks, and many kinds of mice, rats, and voles. The Yellow haired porcupine is not uncommon in wooded parts of the State; it has no relationship to that spiny animal of Europe, the hedgehog. Beavers also abound in suitable localities, and their habits have been described at length by Enos Mills and E. R. Warren. We have three kinds of prairie dogs (*Cynomys*, the name meaning dog-mouse). The commonest or most familiar one inhabits the broad plains east of the mountains; in the mountain parks it is replaced by the smaller Gunnison prairie-dog, while the northwest part of Colorado is inhabited by

the white-tailed prairie dog. On account of their depredations, these cheerful and picturesque little animals have been poisoned by the farmers, and may be exterminated over a large part of the area they inhabit. The economic gain will have been purchased at the cost of some loss of natural beauty and incident. The common squirrel of the mountains is Fremont's squirrel (*Sciurus fremonti*), but if we are fortunate we may sometimes see the much larger and handsomer Abert squirrel (*Sciurus aberti*). The chipmunks are numerous in kinds and individuals, but it requires critical study to distinguish the different sorts. The big chipmunk, better called Say's ground squirrel (*Callospermophilus lateralis*) belongs to quite a different genus, and has two pale stripes instead of four. The striped spermophile (*Citellus tridecemlineatus*), common on the plains, is a pretty little animal with stripes and spots down the back. The dark stripes have light spots upon them, producing a very characteristic appearance. Contrary to the habits of many rodents, the striped spermophile is largely insectivorous, feeding on grasshoppers. The common house mouse and brown rat of towns are Old World animals, unfortunately introduced by man. They are not even very closely related to any of our native mice and rats. The trade rat or mountain rat (*Neotoma orolestes*) is common at high altitudes, often entering dwellings. It is called the trade rat because when it is carrying some object, if it sees something more attractive, as a spoon, it will drop its original burden, and go off with the newly found treasure. Thus it seems as if it had offered something in exchange. This rat has a long bushy tail, and is a much more elegant animal than the European rat. The common native mice are the white-footed mice or deer-mice (*Peromyscus*), of which there are several species and local races. The muskrat, with flattened tail, is often seen in ponds. The flattening of the tail is an adaptation for swimming, as in the case of the beaver, but the flattening is lateral, instead of dorsal as in the beaver, and the two animals are not closely related. The Geomyidae or pocket gophers are very well represented in Colorado, with numerous different forms.

BIRDS

More than 400 kinds of birds have been reported from Colorado. More than a hundred of these are casual visitors, which do not normally inhabit the state. Even so, we are richly supplied with birds, especially during the summer months. Watching the birds, with the aid of field glasses, is one of the chief pleasures to be enjoyed in our mountains. The visitor from the eastern states will at first recognize several birds familiar to him, but on closer inspection will find that some of them are not exactly the same as the friends of his childhood. The robin belongs to the western race (*Planesticus migratorius propinquus*), with paler colors. The meadow lark looks like the eastern bird, but its voice is more melodious, with many and varied notes. Audubon named it *Sturnella neglecta*, because before his time it had been overlooked as a distinct form. The flicker has red-shafted feathers, and is separated as *Colaptes cafer collaris*. The common oriole is Bullock's oriole, *Icterus bullocki*, with much yellow or orange on the head. The mountain bluebird (*Sialia currucoides*) will be a surprise and a delight, the male splendid bright blue, without any chestnut. The eastern bluebird may also be seen, as far west as the foothills of the front range.

It astonishes some people to hear that gulls are found so far inland as Colorado. People in Utah will relate how the gulls saved the early settlers by destroying the grasshoppers. Seven kinds of true gulls (*Larus*) have been seen in Colorado, the commonest being the Ring-billed gull (*Larus delawarensis*). It is Franklin's gull which is most celebrated as the friend of the farmer. Vernon Bailey says: "In the northern plains and prairie country Franklin gulls are of the greatest economic importance, the immense flocks living mainly on grasshoppers and other destructive insects. At times a white horde will descend upon a ploughed field, a band of them following at the heels of the ploughman, while long white lines cover the mellow furrows. Recognizing the ploughman as a friend, the birds only get out of his way to let him pass, waiting for him to turn up a fresh supply of food for them."

Of ducks and their immediate relatives we have a great multitude, principally to be seen about the lakes near the

base of the mountains. Swans are very rare. The stately great Blue Heron is common, arriving from the south in April. Our bird has recently been separated from that of the eastern States as a distinct subspecies. The killdeer plover (*Oxyechus vociferus*) is a very common bird, which used to run in the road ahead of travellers, uttering its peculiar cry, in the days when locomotion was not so swift. The wild turkey, common at the beginning of the last century, has now been almost exterminated. On the other hand, certain quails have increased in numbers. The bob-white (*Colinus virginianus*) is well known in Eastern Colorado. The scaled quail, with a high white-tipped crest on the head, inhabits the country south of the Arkansas River, but has spread north and east in recent years. The California Quail (*Lophortyx californica*) has been introduced. The Ptarmigan of the high mountains (*Lagopus leucurus*), has the feet densely feathered, enabling it to walk on snow. The dusky grouse (*Dendragapus obscurus*) is very common in forested regions, and may often be seen with its chicks among the shrubs. The ring-necked pheasant (*Phasianus torquatus*), with long pointed tail, has been introduced from Europe, and is now abundant near the foothills. It may often be seen from the train. Our common member of the pigeon family is the mourning dove (*Zenaidura macrura marginella*), often to be seen sitting on fence posts. The western representative is slightly different from that of the east. The Turkey buzzard, really a red-headed vulture, may often be seen soaring above, but is not the almost domesticated, street-inhabiting bird it is in the West Indies. Mrs. F. M. Bailey says: "As the birds float in the sky, apparently wafted by every passing breeze, they are keeping a sharp lookout over the land outspread beneath them, and so quickly discover any carrion that the ranchmen, who are numbered among their constituents, find it quite unnecessary to bury their offal, depending entirely upon the good offices of this self-constituted garbage committee of Nature's Board of Health." The golden eagle (*Aquila chrysaetos*) is quite common, and does not differ from European specimens. Sclater states that in Colorado it always fixes its eyrie in a crevice or on a ledge in a vertical cliff; such a nesting site has given rise to the name Glen

Eyrie, formerly well known as the residence of General W. V. Palmer. The golden eagle is beneficial to man, in so far as it destroys injurious rodents, but it also feeds on grouse, and on occasion attacks lambs. It is said to be seriously destructive to the lambs of the mountain sheep. Our national bird, the bald eagle (*Haliaetus leucocephalus*), is also found, but is not so frequently observed. We have many kinds of hawks and owls, some of them of large size. Joseph Dixon, in discussing the hawks of California, divides them into groups recognizable on the wing, and the same classification applies to our birds. First are the soaring hawks, all large, the length from bill to tail less than half the spread of wings. These include the red-tail, Swainson's and rough-legged hawks, all decidedly beneficial to the farmer. Because they are large and conspicuous, these birds are frequently shot, under the impression that they do harm. The second group consists of the round-winged long-tailed bird-hawks, considered harmful. This includes species of *Astur* and *Accipiter*, the goshawk, sharp-shinned and Cooper hawks. They live largely on song and game birds and poultry, in complete contrast with the birds of the first group. In flight they may be known by the relatively short rounded wings and long narrow tail, suggesting an aeroplane. The third group is that of the marsh or meadow haunting hawks, represented by the common marsh hawk, known by the white rump patch, and the owl-like ruff of feathers about the eyes. It feeds on mice and gophers, and is highly beneficial. The fourth and last group consists of the long-winged chasers, the falcons, including the sparrow hawk and pigeon hawk. The sparrow hawk is quite harmless, feeding principally on insects. The prairie falcon and duck hawk occasionally attack poultry, but only when very hungry. The pigeon hawk feeds mainly on birds and insects.

The owls destroy innumerable rodents, and are thus beneficial. They also take many grasshoppers. The burrowing owl, found in prairie-dog towns, is often observed on account of its diurnal habits. Mrs. Merriam Bailey says: "The association of owls, (prairie) dogs, badgers and rattlesnakes is far from being that of the happy family circle it was formerly supposed. The rattlesnakes are evidently

attracted to the towns by the supply of tender spring dogs, and it has been suspected that the badgers relish a young owl for breakfast. The owls have been accused of joining in the neighborly round-robin feast and partaking of the young dogs, but, although they eat squirrels and mice in spring and fall, they live for the most part on grasshoppers and crickets. They hunt mainly in the evening and at night, but are often seen catching grasshoppers in the daytime."

Colorado has many sorts of woodpeckers, some of them very common. The red-shafted flicker, which feeds on ants and berries, is something of a musician, liking to drum on the roofs of houses with its hard bill. The red (instead of yellow) under side of wings and tail distinguish it at once from the common flicker of the eastern States, but hybrids are sometimes found where the ranges of the two meet. Lewis' woodpecker, greenish-black above and pinkish-red beneath, commemorates the explorer Meriwether Lewis. A familiar sight in the mountains during the summer is the Broad-tailed humming bird (*Selasphorus platycercus*). It is not unusual to find the beautifully constructed nest in some bush or low tree. In the winter, these small birds migrate to Central America, where they seem at home in tropical surroundings.

The magpie is one of the most familiar and conspicuous birds along the foothills and in the mountain parks. It is so similar to the magpie of Europe, that it is regarded as a subspecies (*Pica pica hudsonica*), while the California yellow-billed magpie is separated as a distinct species. Among the pine trees in the mountains we are sure to see the handsome dark blue long-crested jay (*Cyanocitta stelleri diademata*). It feeds on insects and pine seeds. The white headed jay or camp-robber is the impudent but fascinating bird which comes around camp in the high mountains, making away with any scrap of food it can secure.

The family Icteridae, peculiar to the Western Hemisphere, contains several favorite birds. First of all the meadow lark (*Sturnella neglecta*), very like the yellow breasted bird of the eastern states, yet at once recognized by its powers of song. Audubon called it "neglecta" because its distinctness had been overlooked by those who did not know it in the field. It is not a true lark, of course, nor are

its relatives the so-called blackbirds true blackbirds in the original sense of that word. The yellow headed blackbird, with yellow head and breast, and the red winged blackbird cannot be mistaken, at least in adult male plumage. Brewer's blackbird is very common, the adult males black with greenish and violet tints, the females and young brown.

The house-finch (*Carpodacus mexicanus frontalis*), with beautiful rosy colors in the male, is common about towns, nesting in gardens. The bluish or greenish-tinted eggs are sparsely speckled with black, instead of being thickly spotted as in the English sparrow. The latter bird (*Passer domesticus*) is of course of European origin, having been brought to the United States in 1850. It has spread all over the country, east and west, and is a serious pest.

In the winter, we always like to see the snow-birds (*Junco*), of which there are several different kinds. This genus is peculiarly North American, extending as far south as Panama, where one species exists at a very high altitude. Sometimes peculiar specimens are found, which are regarded as hybrids. A common and very beautiful summer bird is the Louisiana tanager (*Piranga ludoviciana*). The male is bright yellow with a red head, a broad black saddle on the back, black tail and mainly black wings. The female is much more modestly colored, mainly olive green. The name recalls the time when Louisiana was a very large part of the West.

The Vireos (Vireonidae) are neat-looking birds belonging to a specially American family, centering in the more tropical regions. The bill is distinctly hooked at the end. We have several Colorado species. A very interesting study of their food habits has recently been made by Edward A. Chapin. He shows that these birds eat quantities of stink-bugs and other Hemiptera, which are understood to be protected by their odors. The warbling vireos eat many lady-bird beetles, also generally thought of as more or less protected. It would seem, indeed, that these birds are not aware of the generalizations of naturalists. It does not follow, of course, that the various defensive odors, stings etc. of insects are of no consequence. In general, they doubtless save innumerable lives, but some enemies have developed

the ability to overcome or ignore these defences, and profit accordingly.

The numerous warblers also belong to a specially American family, unrelated to the warblers of the Old World. No less than twenty-eight species have been found in Colorado. The Yellow warbler (*Dendroica aestiva*) is sometimes called wild canary, but the true canary is a finch.

The mocking bird occurs in southern Colorado during the summer, but the related cat-bird, with no white on wings or tail, is much more common. It is a good songster, though best known by its peculiar cry, resembling the mewing of a cat.

The common bluebird of Colorado is much more brightly colored than that familiar in the East, the male being magnificent clear blue, without any chestnut. The Eastern bluebird and the chestnut-backed bluebird also occur in Colorado. The Colorado robin is a lighter bird than that of the East, and was separated by Ridgway of the U. S. National Museum as a distinct subspecies (*Planesticus migratorius propinquus*).

REPTILES

Lizards and snakes are very numerous in the desert regions of the Southwest, and in Colorado we have the fringe of this large fauna. We also possess some species, such as the Water snake (*Natrix sipedon*) and DeKay's snake (*Storeria dekayi*) which are characteristic of the eastern States, and extend as far west as the Rocky Mountains. There is a rather common belief that Colorado swarms with rattlesnakes, but as a matter of fact one may spend many months or even years here and never see one. There is one kind, the Prairie Rattlesnake (*Crotalus confluentus*), which was described from Colorado by Say, having been obtained on Long's Expedition. It is widely distributed east of the mountains, having been taken at such places as Denver, Boulder, Estes Park, LaJunta, and eastward to Wray, near the Kansas line. The western diamond rattlesnake has once been taken at Trinidad, while Professor A. E. Beardsley obtained a specimen of Edwards' massasauga in Baca County. These records indicate that a very large part of the State is free from rattlers. Our other

snakes are quite harmless, and indeed beneficial as destroyers of injurious rodents. The Western hog-nosed snake (*Heterodon nasicus*), with upturned snout, has a rather formidable appearance, and is sometimes killed under the impression that it is dangerous. The Bull snake (*Pituophis*) grows to a great size, eight or nine feet long. It devours gophers and related animals, but Mr. L. J. Hersey found it eating the eggs of the Pintail duck. The rather small King snake (*Lampropeltis*) is beautifully banded with red, black and light yellow. It curiously resembles a poisonous snake of the tropics, and were the latter found here, we should assume that we had a case of "protective mimicry", the harmless snake surviving because mistaken by natural enemies for the dangerous one. In the mountains, the garter snakes (*Thamnophis*) are common; they have keeled scales, in 17 to 21 rows. There are several species, so much alike as to have caused confusion.

Of lizards we have 17 species, while New Mexico has 32. The skinks, with smooth polished scales, are represented by four species. The striped lizards, with deeply bifid tongue, belong to the genus *Cnemidophorus*, of which we have three representatives. Our best known lizards are the so-called Horned Toads (*Phrynosoma*), broad-bodied little animals which eat ants and beetles. They often show resemblance in color to their surroundings, specimens found on red soil being prevailingly red. Our commonest species has been called *Phrynosoma hernandesi*. The English naturalist, Dr. A. R. Wallace, told me that on one occasion a live Horned Toad was sent to him in the mail from Western America. It successfully crossed the Atlantic, but was discovered by the post office authorities in London. Dr. Wallace, living in Dorset, received a polite note from the post office, saying that it was illegal to transmit the animal to him in the mails, but if he would come to London he might have it. This he could not well do, so he sent word to Dr. A. Gunther of the British Museum, a great authority on reptiles, that he might have it if he cared to go after it. Dr. Gunther kept it as a pet in his house for some time, allowing it to run about the floor. One day the front door was accidentally left open, and the little creature ran out in the road. Some workmen mending the road saw it, and esteeming it dangerous, de-

stroyed it with their tools. The Swifts (*Sceloporus* and *Uta*) include several lizards widely distributed over Colorado. The Yellow-banded Swift is found from Wray to Grand Junction, but not at high altitudes.

The terrestrial Box-tortoise (*Terrapene ornata*) is not rare east of the front range. It has four toes on the hind foot, whereas the *Terrapene triunguis*, which has been found at Wray, has only three. The Painted Turtle (*Chrysemys belli*), elegantly marked with yellow, orange or red, is common in the lakes near Denver and Boulder, and goes east to Wray. The large snapping Turtle (*Chelydra serpentina*) belongs to the region east of the mountains, as also does the yellow-necked mud turtle (*Kinosternon flavescens*) and the soft-shell turtle (*Amyda spinifer*). Many extinct species of tortoises and turtles have been found fossil in Colorado, some of them very large. In very remote ages, the country was full of enormous reptiles, the dinosaurs, and crocodiles also existed.

AMPHIBIANS

The Amphibia include frogs, toads and salamanders, so far as Colorado is concerned. The Tiger salamander, water-dog or axolotl, *Ambystoma tigrinum* of zoologists, is extremely common, breeding in mountain lakes. The adult, which takes to the land, has large yellow markings on a dark ground. The immature aquatic stage is entirely dark, and has large tufted gills on each side of the throat. This is our only salamander, our dry country being poorly suited to these animals. Of the typical frogs (*Rana*) we have also only one species, the *Rana pipiens* which is so abundant in the region of the foothills, and in some of the mountain parks. The common name, Leopard Frog, is not much more suggestive than Tiger Salamander. Our other frogs, namely the Three-lined Frog, the Cricket Frog, and the Arizona Tree-frog, are not often observed. The Cricket-Frog only just enters Colorado, having been found by Dr. M. M. Ellis near Wray, on the very border line of the State. We have several kinds of toads, six species of *Bufo*, and the Spadefoot (*Scaphiopus*). The common species around Denver is the American Toad (*Bufo americanus*), but the Woodhouse

Toad (*B. woodhousei*) may also be found. They are separated by the form of the bony crests on the head; if the median crests are parallel, joining the lateral crests at right angles, we have the Woodhouse toad; but if the median crests diverge posteriorly, and there is a short diagonal crest at each posterior inner corner, it is the American toad. At high altitudes we may expect to find the mountain toad (*Bufo boreas*), which has no bony crests on the top of the head.

FISHES

The Colorado fishes have been described in detail by Dr. M. M. Ellis (University of Colorado Studies, 1914). He shows that of the native species, 33 are found east of the Continental Divide and only 9 west of it. There are 28 species known from the Platte drainage, 17 from that of the Arkansas, and of these 12 occur in both. The Rio Grande Basin has about half a dozen recorded native species north of the New Mexico boundary. Out of a total of about 42 native species, no less than 23 belong to the Cyprinidae, the family of carps, gold-fish and minnows. The Sculpin (*Cottus*) is found on both sides of the Continental Divide, but in general the fishes of the eastern and western slopes are entirely distinct. Thus our common genus of minnows, *Notropis*, has seven species east of the main range, but not a single one on the western slope. The native Colorado trout have a bright red mark on each side of the throat along the edge of the lower jaw. The form of the Arkansas-Platte drainage (*Salmo clarki stomias*) has the spots comparatively few and large, mainly in the region of the tail. In the Rio Grande basin we find *S. clarki spilurus*, the spots numerous and of moderate size, while there is usually a pink or reddish band along each side. *S. clarki pleuriticus*, of the Western slope, has smaller scales, darker color, and very many spots over the entire body. In addition to these is a special form, *S. clarki macdonaldi*, which was found in Twin Lakes, and is now perhaps extinct. It is especially known by the bright yellow fins. In modern times, so many trout from other regions have been placed in our waters, that the identification of specimens caught is no longer as easy as it used to be. We may find the Eastern Brook Trout,

with bright red spots, and the lower fins with anterior margins white. Or it may be the European Trout, with red spots surrounded with white. The fine Rainbow Trout is now quite common; it lacks the distinct red marks on the throat, the sides have a broad orange or red band, and the fins are mostly tipped with white or yellow. The Mackinaw Trout has been introduced into Twin Lakes.

In Eastern Colorado we have two native and one introduced catfishes, but suckers exist on both sides of the divide, though of different genera. In the streams flowing east from the front range the Common Sucker (*Catostomus commersonii*) and the Gray Sucker (*C. griseus*) are very common. The former has larger, the latter much smaller scales. These same streams also contain many minnows and minnow-like fish of the family Cyprinidae. Unfortunately mining and milling operations have proved very destructive to the fishes in a number of instances, the refuse substances thrown into the waters killing them wholesale. A very striking example was cited by Dr. Ellis. In 1903 Dr. C. Juday collected the fishes in Boulder Creek with great care. He got eight species, one of them new to science. In 1907 the fishes in the creek were destroyed in the manner mentioned, and among the many dead specimens a ninth species, which had not previously been described, was secured. In 1912 Dr. Ellis made an exhaustive survey of the fish life of the same stream, but obtained three species only, the two kinds of sucker and the Horned Dace. All the others had totally disappeared. Whether any of them have come back in the thirteen years since, is not known.

A curious and interesting fish is the Flat-headed Chub (*Platygobio physignathus*), which inhabits the Arkansas River from Salida to Pueblo. It has a somewhat flattened head, which distinguishes it from other Colorado Cyprinidae. Although the minnows and their relatives do not usually extend to high altitudes, the Black-headed minnow is abundant in Glacier Lake, Boulder County.

We have two kinds of Killifishes (Poeciliidae), occurring in the streams of Eastern Colorado. One of these, the Zebra Fish, is easily known by the strong vertical dark bars alternating with light ones, and the squared-off tail. The other, the Little Red-fin, is not barred, and has the pectoral, ven-

tral and anal fins yellow, with a broad margin of bright red. The Rocky Mountain Bullhead or Sculpin (*Cottus punctulatus*) is found in our mountain streams. It is stated to be destructive to the eggs and young of trout. The perch family (Percidae) is represented by various small darters, found east of the mountains. The Green Sunfish (*Apomotis cyanellus*) also appears to be native in the same region. Numerous members of this family have been purposely introduced; such are the Blue Gill, Rock Bass, Calico Bass, Warmouth Bass, Large-mouthed Black Bass, and Small-mouthed Black Bass. Eels are stated to exist in the Rio Grande in Colorado, but have not recently been observed.

MOLLUSCS

Compared with many other countries, as for instance England or the West Indies, Colorado is poor in land snails. Furthermore, most are small, and none are brilliantly colored. Of slugs, which are simply snails without any external shell, there is only one native species, a small brown one found in the mountains. Certain European slugs have been introduced, and are found in gardens, where they are sometimes destructive. Our largest land snails, not so large as a half-dollar, belong to the genus *Oreohelix*, the name meaning mountain snail. That these snails have existed for many millions of years in the Rocky Mountains is proved by the discovery of fossils in Wyoming and New Mexico. It is true that the fossils are not of the same species as those now living, but they are closely related. The commonest *Oreohelix* is the large rather flattened form called *O. depressa*; but the more elevated subglobose *O. cooperi* is frequently found. At Glenwood Springs, on the side of the river away from the town, Ellsworth Bethel discovered a very elegant form with strong spiral ridges. It was named *O. haydeni betheli*; a subspecies of the Utah *O. haydeni*. Occasionally, specimens of *Oreohelix* are found with reversed coiling, like a looking-glass image. An analogous reversal rarely occurs in human beings, the heart beating on the right side instead of the left.

It is a curious thing that the small species of snails are much more widely distributed than the large ones. In the southwest, many a mountain range has its peculiar kinds of

large snails, but the small ones are found to be the same as those of other ranges. One of our common Colorado species, the shiny elongate *Cochlicopa lubrica*, is equally common in Europe and northern Asia. It seems probable that the wide distribution of small land snails is largely due to the wind, which readily moves them, but does not affect the larger kinds. Some of our snails are very similar to those of the Old World, yet distinguishable. Thus the little greenish Glass Snail (*Vitrina alaskana*), which can be seen crawling even in cold weather, is exceedingly like the common *Vitrina pellucida* of Europe. The pretty little *Vallonia cyclophorella* was formerly thought to be identical with a species of Europe, and when the French zoologist Ancey proposed to separate it, there was some indignation expressed. Today, however, every student recognizes it as a distinct species. An excessively small snail, found in aspen groves, is called *Punctum*, the word meaning a point, which in geometry is said to have neither length nor breadth. The only way to collect such minute objects is to gather a quantity of leaves and debris, and sort them on a sheet of paper.

If a snail shell is held so that the aperture faces the observer, that aperture will be either on the right or left hand. If it is to the right, the shell is said to be dextral; if to the left, sinistral. From the same Latin roots we derive the English words dexterous and sinister. There are two common genera of freshwater shells distinguished by this character. *Lymnaea* is dextral, *Physa* is sinistral. Both may frequently be found in ponds. These are lung-breathing water snails, which come to the surface for air. There is a third genus, also common, which is coiled in one plane, having no elevated apex or spire. This is called *Planorbis*, the name meaning flat orb or circle. Some kinds of *Planorbis* are rather large and very stout, others are small and flat. Still another group includes the freshwater limpets, small delicate shells looking like a fairy cap. A very interesting new species of this type (*Ancylus hender-soni*) was recently discovered by Professor Junius Hender-son in Lake Eldora. Its nearest relative is a species of Europe. In the hot spring at Wellsville, Fremont County, or rather in the rivulet running from it, a new sort of *Physa* was discovered in 1887. As it was of a shining coppery

color, it was named *Physa cupreonitens*. For many years it was not seen again, but in 1924, about thirty-six years after the original discovery, Professor Henderson went to the same spot and collected a bottle full. Certain fresh-water snails, such as the *Lymnaea bulimoides cockerelli*, live in pools near the foothills which dry up during part of the year. The snails survive in the mud, and become active as soon as water is available. Some of these *Lymnaea* snails have been proved to be the hosts of the immature liver fluke, which is so fatal to sheep. The young flukes, leaving the snails, attach themselves to the grass at the edge of the pond, and this grass is eaten by the sheep.

There are very many kinds of freshwater clams or bivalves in the Mississippi Valley, where they furnish mother-of-pearl and occasionally true pearls. In Colorado these molluscs were formerly numerous, but at present they are reduced to comparatively few species. Some of these are large, others excessively small. Professor Henderson has lately collected the small forms in the various mountain lakes, finding several new species. Some were from altitudes over 11,000 feet. There are still many lakes to be examined for these little shells.

A detailed account of the Rocky Mountain Mollusca, by Henderson, appeared in *University of Colorado Studies*, Vol. XIII, No. 2 (1924). It includes a good bibliography.

In our Paleozoic and Mesozoic strata there are many fossil shells which lived in the sea, at the time when much of Colorado was under water. These shells are of great importance to the geologist, as each period has its special forms, and by means of these the strata may be recognized. The large clams of the extinct genus *Inoceramus* are very useful for distinguishing horizons in the Upper Cretaceous. Oysters (*Ostrea*) are not so satisfactory, because they frequently lack obvious distinctive characters, or these have not been preserved. The oysters are very conservative molluscs, which have produced innumerable species throughout many millions of years, without any appreciable advance in organization. Some of the most interesting fossils are Cephalopoda, belonging to the group represented today by the nautilus. Some of these have a cylindrical form, and are taken by the uninitiated for fossil snakes.

ARTHROPODS

The Crustacea include crabs, lobsters, crayfish, shrimps, barnacles, pill-bugs, woodlice, and many smaller forms which are not usually observed. The largest Colorado Crustacea are of course the crayfish (*Cambarus*), the commonest species being the one called *Cambarus diogenes*. The name has reference to its living in burrows, suggesting Diogenes in his tub. There are some very interesting Crustacea found in temporary pools near the mountains. They survive in the mud during dry weather. One genus (*Estheria*) has a bivalved shell, and can be taken for a mollusc if attention is not paid to the feet. The group is of enormous antiquity, fossil *Estheria* shells being found in very ancient rocks. The very small Crustacea, known as Entomostraca, are very numerous in species and individuals, forming an important part of the food of fish. They have been specially studied by Professor Gideon S. Dodds, who has published an account of the kinds found in numerous mountain lakes. Many of the species also occur in the Swiss Alps, but several are peculiar to North America. Some have very elegant colors, as may be seen when they are examined with a good lens. The small bivalved Ostracoda are also very common, and are being collected and studied by Professor A. E. Beardsley of Greeley. Fossil Ostracoda are found at Florissant.

The Isopoda, or woodlice and pill-bugs, are terrestrial, being very common under stones. All those I have seen in Colorado are species introduced with plants from Europe. The common pill-bug (*Armadillidium*) rolls into a ball when alarmed, like an armadillo. The Amphipoda are like small shrimps, flattened sideways, and very active. There is a common species (*Gammarus limnaeus*) in mountain lakes.

Those who wish to study the freshwater Crustacea, and other animals of our streams, rivers and lakes, will find a great deal of information, and good figures, in *Freshwater Biology*, by Ward and Whipple, published in 1918. This book makes it possible for any amateur who has a microscope to begin work on his own account, with every prospect of making discoveries as his skill and knowledge increase. For research work, other publications will be necessary, but these are listed at the ends of the chapters in

Freshwater Biology. An account of the Entomostraca of Colorado (excluding Ostracoda), with many figures, appeared in *University of Colorado Studies*, Vol. XI, No. 4 (1915).

The millipedes are cylindrical or more or less flattened, and move slowly, thus contrasting with the swift and agile centipedes. We have several species in Colorado, some native, others accidentally introduced. Two species have been found fossil at Florissant.

The small red-brown centipedes belonging to *Lithobius* and related genera are very common under rocks. We also have very long and slender forms of the *Geophilus* type. The large *Scolopendra heros* is found at lower elevations, as far west as the base of the mountains. The extraordinary long-legged *Scutigera*, an accidental importation from the south, is sometimes found in houses.

The very numerous mites, some free living, other parasitic on various animals or forming galls on plants, have received little attention up to the present time. The so-called clover mite (*Bryobia*) sometimes causes alarm by entering houses in great numbers. The red spider of the gardener (*Tetranychus*) is really a mite. Ticks are relatively gigantic mites, and are of special importance because some of them carry disease-producing germs. The common wood tick of Colorado (*Dermacentor andersoni*) is connected with the transmission of Rocky Mountain Spotted Fever. This is an exceedingly rare disease in Colorado, but everyone should be careful to avoid being bitten by ticks. After an excursion, if the ticks are carefully removed from the body and clothes, there will be no danger. Fortunately, the ticks disappear almost entirely after mid-summer, and are only abundant in the spring.

We have listed 187 species of Colorado spiders, but probably as many as 500 actually exist. Some are especially noteworthy, as the yellow crab spider which sits on yellow or pink flowers and catches bees. Certain hunting spiders (*Phidippus*), bright red on the upper surface of the abdomen, are very conspicuous; others are small and look like ants. The large fat orb-weaving spiders, seen about porches, belong to the genus *Epeira*. A black spider, with a red spot at the end of the globose abdomen, is reputed to

be specially poisonous to man, but we never hear of any harm arising from it here. Many fossil spiders are found at Florissant, all belonging to extinct species. A fossil spider was also found in the much older oil shales of the western slope.

The Harvest Spiders (Phalangida), Pseudoscorpions, Scorpions and Solpugids are also represented in Colorado, but in no case by very many species.

So far as at present catalogued, there are more species of insects than of all other animals combined. They are adapted to very varied conditions. This diversity of adaptation may be said to explain the multiplicity of species; but it is possible to put it the other way, and say that the innumerable modifications of insect structure permit diversity of adaptation. The study of fossil insects indicates that progressive evolution has been very slow in the last fifty million years or so. Some very ancient fossils closely resemble species of the present day. Yet fossils also show that, in spite of the long permanence of general types of structure and even color-marking, the species as such change from period to period, constantly giving rise to slightly different forms. Thus the world has come to be peopled with the myriad host of insect life; butterflies and bees, bugs and beetles, locusts and dragonflies, and thousands of others which from time to time obtrude themselves upon us, or work in modest retirement where we never see them. The Entomologist, the student of insects, has an immense task before him. Work as he will, he cannot completely know the species of his own neighbourhood. He is obliged to specialize, to become a lepidopterist, or a coleopterist, or an economic entomologist. Even the coleopterist, who studies beetles, cannot hope to know all beetles, but has to concentrate on certain groups. The outlook might be considered discouraging, if we could only be satisfied with complete success. But it is much better to regard it in another light, and say that here lies the greatest opportunity, here is a field in which every patient and competent worker may reap a rich harvest of discovery. Colorado entomology has occupied many students, but not nearly half the work has been done. The visitor who comes here in the summer is struck by the abundance of insect life. Many years ago, the Asso-



(The portraits of Parry and Engelmann furnished by courtesy of the Missouri Botanical Garden.)

COLORADO NATURALISTS

1. Dr. C. C. Parry.
2. Dr. George Engelmann.
3. Thomas Say.
4. C. E. Aiken.

ciation of Agricultural Experiment Station workers met in Denver. The delegates were taken on a special train to Fort Collins, and as we travelled, a reporter went through the cars. He came to Dr. John B. Smith, entomologist to the State of New Jersey, a striking personality of German extraction. "What do you think of Colorado?" Smith was all animation: "Colorado! It is a wonderful State; why, I went out the other day and caught more kinds of grasshoppers than I could find in New Jersey in a month!" I looked in vain for Smith's testimony in the Denver papers, but his feeling of admiration was perfectly genuine.

Perhaps it is only fair to add that most of these grasshoppers feed on wild plants, and are quite harmless to agriculture. On the whole, Colorado is remarkably free from insect pests, though we accidentally introduce new ones from time to time. Twenty years ago we could grow asparagus practically free from enemies; but now the asparagus beetle, brought from Europe, is a constant evil. Twenty years ago, also, we had no locust borers; but now the handsome yellow-striped beetles (*Cyllene robiniae*), from the Eastern States, abound in our streets, and their larvae destroy the locust trees. But we have no gypsy moth, or Japanese beetle, or Hessian fly, or a dozen or more other first-class pests of other sections. The true chinch-bug (*Blissus*) is represented in our region only by a very rare native form, which does no harm. When we make a map of the distribution of the malaria mosquitoes (*Anopheles*), we find one great area apparently free from these insects, including Colorado in and east of the mountains. Consequently, it is usually impossible in our State to acquire malaria; and of course quite impossible to acquire yellow fever, the carrier of that (*Stegomyia*) being exclusively southern. We have quite a list of native scale insects and mealy bugs, but few of these injure crops. Professor Gillette writes me that he has catalogued 243 species of plant-lice (Aphididae) from Colorado, but most of these feed on wild plants. The wild bees of Colorado number about 780 species, but these bring about the pollination of the flowers, and are to be considered useful. The butterflies, remarkable for their beauty and variety, are mostly harmless, though the introduced cabbage butterfly (*Pieris rapae*) pro-

duces a green velvety caterpillar which severely injures cabbages.

The Coleoptera (beetles) of Colorado were catalogued by Professor Wickham of the University of Iowa in 1902. He was able to recognize about 2165 kinds, and since then some hundreds have been added. Certainly very many remain to be discovered, and many localities to be searched. A number of years ago Col. T. L. Casey began describing numerous new beetles which were said to come from Boulder County. I wrote to ask how he came by them, and he replied that one year his wife was visiting at Magnolia, and at his request gathered what she could, and especially collected a quantity of leafy debris in a bag. From this material numerous minute and interesting beetles were secured. The same method was used by Beebe in South America. When about to leave, he took a sack full of trash, and examined it minutely on the ship. In the lot thus obtained were several new species, in this case of ants. The very little things, only clearly visible when magnified, often show the most remarkable structures. Not only do they exist in debris and in the soil, but in the air. Some years ago an entomologist from the Hawaiian Islands was invalidated to California. He was in such a condition that he could not walk about, but he could ride. He went up and down the country in an automobile, holding out to the breeze a very fine-meshed insect net. As a result, he made a remarkable collection of small insects, some of them very rare. It still remains for some one to try this method in an aeroplane, and see how high insects fly. To judge from the swifts and swallows hawking on summer days, they go to a considerable altitude. Sometimes they are carried upward by ascending currents, and on several occasions insects of various kinds have been found, numbed or frozen, on the surface of the snow on our mountain tops. Such insects are always those of lower altitudes, the genuine high alpine fauna knows how to take care of itself. Our most famous beetle is of course the Colorado potato beetle, *Leptinotarsa decemlineata* of Say. It was discovered by Thomas Say on Long's Expedition, feeding on the wild yellow-flowered buffalo bur. When potatoes came to be cultivated in the West, it spread to these, and multiplying excessively, even reached the At-

lantic coast. It has now appeared in Europe. In Colorado it is not as a rule common, and one may live for years without seeing one. A similar but much smaller beetle is abundant on sunflowers. It has an exclamation mark on each side, and so is named *Zygogramma exclamationis*.

As might be expected, we have many beetles which attack timber trees. The long-horned beetles (Cerambycidae) and the often beautifully metallic Buprestidae have larvae which bore in wood. The bark beetles (Scolytidae) make galleries under the bark, and frequently do an immense amount of damage. Following these insects are many others, some preying upon them, others living in the dying and dead tissues. Thus a tree killed by bark beetles is likely to be a perfect insect menagerie, and one may be puzzled to know which species is the real and primary culprit.

The Hymenoptera include bees, wasps, ants, ichneumon flies, sawflies and their relatives. Their number is as yet unknown, but they are excessively numerous. For twenty years I have studied the wild bees of Boulder, but new species are yearly discovered not far from the University. Dry regions are most favorable for bees and digger-wasps, probably because they afford better facilities for nesting. In the Old World, we find these insects most abundant in such regions as Algeria, South Africa and Turkestan; in America in the great southwest. In the forests, the parasitic Ichneumonidae, which develop in the bodies of other insects, may be found in great quantities. Some years ago I paid special attention to them, and obtained a considerable series of species from correspondents. I thought I could then identify those I had found in Colorado, but in the majority of cases the species were not the same. I then sent a small series to the National Museum, and was told that many were apparently new. This whole group of Hymenopterous parasites, as found in the Rocky Mountains, offers a splendid field for research, but only the most persistent will overcome the difficulties and win a way to success. Colorado ants are various and interesting. The most conspicuous is the mound-building red ant, *Pogonomyrmex occidentalis*. The generic name means bearded ant, and it will be seen that on the under side of the head are long curled hairs simulating a beard. The large rounded hills are familiar

along the foothills, and far out on the plains. They are covered with little stones of singularly uniform size, namely those they can conveniently pack out in their mandibles. Also in the foothills, and up into the mountains, ants of the northern genus *Formica* build mound nests of little sticks. Still larger ants, closely related to the last, are those which nest in logs, of the genus *Camponotus*. Such ants are found in northern regions all round the World. Most singular of all are those named *Myrmecocystus horti-deorum*, living in the Garden of the Gods. This formidable name means, simply, the Cyst-ant of the garden (*hortus*, a garden) of the Gods. They are long-legged ants which run about the oak bushes, and disappear down vertical tunnels in the ground. Underneath, if you dig, you will find chambers with arched roofs, and on these hang the replete. These replete are simply ants which serve as living honey-jars. Fed far beyond their own requirements, their abdomens swell up until they are globular, about the size of a pea. During the season when food is not obtainable out of doors, they disgorge the sweet liquid, and feed the colony. Another strange ant, which may be found at Florissant, is the red *Polyergus*, which enslaves the *Formica*. It cannot feed itself, but depends on its slaves. Why do they not go off and leave it, as it seems they easily might? They are enchain'd by their own instincts.

On rose bushes it is not uncommon to see swellings or galls, produced by Hymenoptera of the genus *Diplolepis* or *Rhodites*. If these galls are gathered early in the year, they will usually produce the gall-flies, and in addition several kinds of parasites which have lived at the expense of the gall-makers. The galls occur on wild roses, and are of several kinds, some spiny, others large and smooth, while one species produces small lenticular swellings of the leaflets. The European sweet brier is now grown in gardens, and at Boulder it is severely attacked by the European *Rhodites rosae*, which produces large hairy galls of a fine red color, ultimately fading to a dull brown. How this insect reached Colorado we do not know, but it must have come in galls on imported roses. In the region about Colorado Springs and southward many galls are found on oak bushes. These

are caused by insects related to those of the roses, but of different genera.

A list of Colorado butterflies includes 212 species, and in addition numerous varietal forms. Furthermore, ten kinds of butterflies have been found fossil at Florissant; a matter of considerable interest, as no others have yet occurred in the rocks of the Western Hemisphere. Naturally, the 212 living species are not all found in any one place. The reason why the number is so great is because different environments produce different kinds, and we have so many different environments. The beautiful silver-spots (*Argynnис*), the larvae of which feed on violets, have to breed where these plants occur. The grand *Parnassius*, with red and black spots on a white ground, is dependent on stonecrop. Others require nettles, or wild plum, or sunflowers, as the case may be. The swallow-tails (*Papilio*) are particularly well developed, with no less than nine species recorded. The so-called Sulphurs (*Euryimus* or *Colias*) are unusually interesting, on account of the great variation of some of the species, in one case from orange to clear yellow, and in females to white. A member of this genus, common in the mountains, was received by W. H. Edwards when England was rejoicing over the marriage of a Danish princess to the Prince of Wales. He was sentimental enough to name the new butterfly *Colias alexandra*. The other day Queen Alexandra died, but her butterfly still appears on the hillside, fresh and beautiful. The males are sulphur yellow with a black border, but in the female the border is absent, leaving only a dusky shade on and about the tips of the front wings. There is also a white variety of the female. There are certain strong-flying butterflies which are very widely spread over the earth, all around the world in temperate regions. Thus we find in Colorado the Mourning Cloak or Camberwell Beauty (*Euvanessa antiopa*), the Red Admiral (*Vanessa atalanta*) and the Painted Lady (*Vanessa cardui*), all of which may be likewise observed in Europe. The two last are even to be seen in the Hawaiian Islands. Some butterflies and moths migrate long distances. There is a very large tropical moth (*Erebis odoratus*) which occasionally wanders as far as Colorado, having been taken at Boulder and Leadville. In September 1914 the cotton moth of the south (*Alabama argillacea*) appeared at the lights in

Boulder in vast numbers. About the same time they similarly appeared at St. Paul, Minnesota, indicating a general migration northward. They all perish, of course, leaving no offspring, the necessary food-plant being absent and the climate impossible. Aside from these migrations, the native species vary in numbers from year to year. In July, 1913, Mr. E. Bethel sent specimens of a moth (*Simaethis diana*), the larvae of which had defoliated the birches in Boulder Cañon to such an extent that it seemed as if they had been burned by fire. Our form of the moth is the grey variety named *betuliperda*, on account of its feeding on birch. At other times the velvety caterpillars of *Malacosoma fragilis*, living in web-like nests, defoliate the aspens in the Canadian Zone.

One of our most beautiful moths is the small *Rhododipsa masoni*, the thorax orange and the anterior wings deep rosy red. It seems always to be found on the flower heads of *Gaillardia*, with the colors of which it perfectly harmonizes. It was discovered near Denver by Mr. J. Mason, whose great collection of butterflies and moths is now in the City Park Museum. The discovery, as Mr. Mason told me, was quite accidental, due to the picking of a *Gaillardia*.

It is interesting to notice that in rather numerous cases a moth or butterfly of the eastern States is represented in Colorado by a closely related species, or a slightly modified variety. This, of course, is entirely parallel to what we find among the birds. The great *Cecropia* silk moth (*Samia cecropia*), which actually enters eastern Colorado, is replaced in the Rocky Mountains by *Samia gloveri*. The *Io* moth (*Automeris io*), so different in the two sexes, has a western variety *coloradensis*. The eyed hawk moth known as *Smerinthus jamaicensis* is found with us in the form recently (1925) named *gamma*, because it has a mark on the wings resembling the Greek letter. There is a narrow-winged little moth in the East, its larvae feeding in little armies, side by side, on leaves of grapes. In Colorado we have a distinct but closely related species, called *Harrisina metallica*. I have observed it on the University of Colorado campus.

The Hemipterous insects of Colorado were catalogued by Gillette and Baker in Bulletin 31 of the State Agricultural Experiment Station (1895). The list is now much longer, thanks to the activities of Professor Gillette and other workers. Thus in 1895 nine cicadas had been listed, but W. T. Davis, in 1921, was able to catalogue 23 species from Colorado, not counting three others found fossil at Florissant. This great increase in the number of records is especially significant, because these are large and conspicuous insects, which call attention to themselves by their incessant cries. Often, it is true, they sit high up in the trees, where they are difficult to secure. Collectors sometimes bring them down by shooting, but Dr. F. E. Lutz tells me that he finds it convenient to watch for those great wasps (*Sphecius*) which attack cicadas and carry them to their burrows. As the wasp drags the bulky insect along, it is robbed of its prey, in the interests of science. One of the Colorado cicadas (*Platypedia putnami*) commemorates its discoverer, J. Duncan Putnam. This young entomologist, who had already done brilliant work, and was expected to be one of the leaders in the science, came to Colorado hoping to recover from consumption. The disease had gone too far, and he eventually succumbed, but his cicada still chirps in Clear Creek Canyon, where he found it in 1872.

One of our most familiar Hemiptera is the Box-elder Bug (*Leptocoris trivittatus*), which lives on box-elder trees in the towns, and often enters houses. The bright red young often cause surprise, but need occasion no alarm, as they are quite harmless. The smaller Hemiptera, as for instance the minute winged forms which occur on grape vines, are often very beautifully colored. Even the plant lice or aphides are not without beauty, as may be seen from the colored plates published by Professor Gillette and Miss Palmer in 1924 (*Annals Entomological Society of America*).

The true flies or Diptera include some which suck blood, others feeding on plant tissues, many which are scavengers, and numerous forms parasitic in the larva state on other insects. The blood-sucking mosquitoes and buffalo gnats pass their early stages in the water, the Simuliidae or buffalo gnats only in swiftly running streams. The genus *Symporomyia* (Family Leptidae) consists of innocent

looking flies found in the mountains, savagely attacking human beings to suck their blood. In the Roan Mountains, in particular, they were a constant pest. When one settled on the hand and inserted its proboscis it appeared quite oblivious to danger, and could be picked off and destroyed. Horse flies (Tabanidae) are also a source of trouble, as they are all round the world. In the haying season it is necessary to afford protection to the horses.

Many small delicate gnats (Cecidomyiidae) lay their eggs in plants, and galls result, wherein the usually orange larvae feed. Such galls are common on willows, sometimes looking like small cabbages at the ends of the branches. Others occur on sage (*Artemisia*), and a variety of other plants. Dr. E. P. Felt of New York took up the study of this group several years ago, and revealed to us an astonishing number of species, hundreds being new to science. In Colorado comparatively little has been done, and there is an excellent opportunity for a student, using Felt's exhaustive account of the known American forms as a basis.

In nests of ants we sometimes find very curious objects, looking like small fat slugs. The resemblance to slugs is so close that certain European writers have actually described them as Molluscs. About ten years ago Miss Hazel Andrews (now Mrs. Owen Cattell) undertook to raise these larvae to maturity, and found it could easily be done by keeping them in a jar with some of the proper ants. They hatch into flies called *Microdon*, which are not very often found at large, and so are not very well known. One of the kinds raised in Boulder proved new to science, and was named *Microdon coloradensis*.

The blood sucking tsetse flies (*Glossina*) inhabit Africa, and carry the germs of sleeping sickness. No such fly has even been found living in America, so it was a matter for great astonishment when a fossil one was discovered at Florissant. Later on, others were found in the shales, so that we actually know four different species from their fossil remains. We can only wonder what effect they had on the life of millions of years ago in Colorado. Did they then communicate the germs of disease? Were they the cause of the disappearance of some of the animals now extinct?

And what was it that brought about their own destruction on this continent?

Reference has already been made to the numerous grasshoppers of Colorado, but it is not generally known that we have two kinds of mantis, and a small stick-insect (Phasmidae). Cockroaches occur in the towns, having been introduced from abroad. There is a very pretty little green species (*Panchlora*) not rarely found in bunches of bananas.

Although the country is relatively dry, there are many dragon-flies and damsel-flies, some of them large and handsome. The *Agrion aequabile coloradicum*, discovered at Overland Lake in Boulder County, is a lovely object, with slender metallic green body, and the wings of the male broadly black apically. As is the case with many moths and birds, it is a western mountain race of a species found in the eastern States.

LOWER INVERTEBRATES

There are many diverse animals included under the term "worms," even if we exclude such larvae of insects as cut worms, army worms, etc. We have species living in fresh water, in damp earth, and many which are parasitic. These are divided into several great groups, such as the flat worms, the round worms, the earth worms and leeches. Even the rotifers, microscopic freshwater animals, are related to the worms. The common earthworms are not native here, but have been brought in with soil, and have spread since irrigation became general. Old settlers say there were no earthworms when they first arrived. The thread worms are excessively numerous, many living in the soil, and many in the intestines of animals. The invention of cooking, in addition to the advantage of rendering food digestible and palatable, was very beneficial in preventing infestation by worms. The eating of insufficiently cooked meat is still a source of danger, especially in places where the meat is not subjected to adequate inspection.

The one-celled animals (*Protozoa*) are so minute that they cannot be seen without a microscope, but every drop of water at the bottom of an ordinary pond contains many of

them. They exist in water, in the soil, and as parasites of animals, including man. There are very many kinds, differing greatly in appearance and habits, but these are mostly very wide spread over the earth. The same species which we get in Colorado lakes may be found in lakes in Switzerland and many other countries. Some are naked, such as the amoeba, others are covered with a little shell. Some travel slowly, others progress rapidly through the water, by means of cilia or a flagellum.

Closely related to the Protozoa, and probably to be included with them, are the Mycetozoa or slime-molds. These are so similar to fungi that they are commonly included among the plants; and indeed with respect to several organisms classed as Protozoa, it is difficult to say whether they are plants or animals. The slime-molds of Colorado have been studied by Sturgis and Bethel, and found to be very numerous.

The shelled marine Protozoa known as Foraminifera are abundant as fossils in deposits of Cretaceous age. As they differ in different periods, they serve to mark geological horizons, and are proving to be of great value to oil geologists and others. On account of their minute size, they come up unbroken in well borings. For an account of the Colorado Protozoa, see *University of Colorado Studies*, Vol. VII, No. 4 (1911), and Vol. IX, Nos. 2-3 (1912).

FLOWERING PLANTS

The flora of Colorado is rich in species, and remarkable for the profusion of bright and beautiful flowers. It does not possess the mixed hardwood forests so characteristic of the Eastern United States and of the temperate parts of Asia. The plants of Miocene times, preserved as fossils at Florissant, indicate the former existence of such forests, with elms, figs, redwoods, magnolias, walnuts, hollies, and many other genera which have since departed from us. Climatic changes are sufficient to account for most of these losses; increasing dryness and cold have exterminated many forms of life, while permitting many others to enter our area and flourish in it. In some cases, disease may

have been a factor, as we see today in the case of the American chestnut and the chestnut-blight fungus. The net result is, that while in one sense we may speak of our flora as an impoverished one, it is possible to say in the same breath that it is of extraordinary richness, and there is no real inconsistency. The many different conditions of altitude, moisture and temperature, often very diverse within a small area, make possible the survival of many types of plants. We may pass in an hour from one flora to another, the two having little in common. From a rather intensive study of the flowering plants and pteridophytes of Boulder County, it was determined that there were about 1,300 species. The area is 751 square miles, a section from the summit of the range to the low lands at the base of the mountains. It was interesting to note that the Canton of St. Gallen, in Switzerland, with 779 square miles, had 1,295 species. The correspondence is almost exact, although the Swiss Alps are of much later date, geologically speaking, than the Rocky Mountains. When we examine our plants more closely, asking whence they came, many interesting facts come to light. The narrow-leaved cottonwood of the lower mountain valleys is very closely related to a common Florissant fossil. It is an example of a group of plants surviving from Miocene times, hardly changed in spite of all vicissitudes. The Yucca or Spanish Bayonet, and the various cacti, represent the Southern or Mexican flora, spreading northward and upward wherever circumstances permit. Even the splendid orange-flowered *Rydbergia* of the mountain tops is related to plants of the Southwest and the Andes. On the other hand, the moss campion (*Silene acaulis*) and the White Mountain Avens (*Dryas octopetala*) are as characteristic of northern or Alpine regions in Europe as in America. The Bearberry or Kinnikinnick (*Arctostaphylos uva-ursi*) is found all around the world in the north. It is one of the sights of Derbyshire in England, where it survives in the upland country. The name (*Arctostaphylos*) means bear berry in Greek and *uva-ursi* exactly the same thing in Latin. The orchid *Lysiella obtusata* is found near Long's Peak Inn, and it was observed that a certain moth (*Rheumaptera tristata*) was visiting it, carrying the pollen mass on its head. Now this same orchid

occurs in a single European locality, in Northern Norway, and the moth is found in that country also. In other cases the correspondence with Old World plants is not quite exact; in the long period of separation there has been some divergence. Thus the beautiful little Twinflower (*Linnaea*), dedicated to the great Swedish naturalist Linnaeus, is slightly different from the Scandinavian plant, some authors regarding it as a distinct species, others as a geographical race. The delicate mealy primrose growing on the borders of mountain swamps was formerly referred to the European *Primula farinosa*, but is now separated as a species or variety (*P. incana*). Quite another class of plants common to Europe consists of the weeds, unintentionally introduced by man. Older residents can remember the arrival of many of these, but some, such as the Alfileria (*Erodium cicutarium*), probably date from Spanish times. The so-called Russian Thistle (which really belongs to the Goosefoot family) probably arrived about 1900, but is now widespread in dry places. The Tumble Mustard (*Norta altissima* or *pannonica*) was first observed in Boulder in 1915; now it is very abundant, and extends up into Wyoming. In Europe, whence it comes, it is not a common plant. Although many introduced plants have become established, others appear for a season, and vanish. Thus the Bur-nut (*Tribulus*) was observed in Boulder several years ago, but it apparently died out, and has not been seen recently.² There is one case in which European weeds have not only flourished, but given rise to hybrids in Colorado. The Goats-beard (*Tragopogon*) is represented by three species, one (called Salsify) with purple flowers, one with chrome yellow, and the third with lemon yellow flowers. Both the yellow ones form hybrids with the purple one, the resulting flowers very pale purplish or lilac. Hybridism in plants is perhaps commoner than is generally believed. Among our native thistles, many hybrids are recorded, and the species of Paint-brush (*Castilleja*) certainly cross. Hybrid roses are to be expected. It must be said, however, that most of the hybrids recorded by botanists are assumed to

² It has reappeared (1926) and is likely to become a serious pest. This is the plant known as the puncture-vine in California, where it is giving a great deal of trouble.

be such because they combine the characters of known species, and experimental proof is lacking. Sir Joseph Hooker used to combine under one specific name plants which were connected by intermediates, but his friend Darwin pointed out that the intermediates might be of hybrid origin. There is an amusing letter from Hooker to Darwin in which he acknowledges that this may indeed be the case, and his "lumping" therefore premature. The fact is, that to fully understand our plants we must closely study them in the field, and in many cases cultivate and breed them. The existing manuals, though they appear very complete and accurate, are merely preliminary works, based almost entirely on herbarium specimens. Thus there is almost endless interesting work for the amateur; work which is likely to result in valuable scientific discoveries, and sometimes incidentally an important contribution to horticulture. Who, for instance, will make an intensive study of our wild roses, cultivating them side by side? They are extremely beautiful, very abundant, yet imperfectly understood. It is necessary to see them at different seasons of the year, in early leaf, in flower, and again in fruit. The colors of the flowers cannot be properly appreciated in the herbarium. In Europe, the roses are being studied in the most scientific way, so we have good models to work from. Near Ward, on the road to Brainerd Lake, I found in 1917 a low growing rose with dark fruit. It is certainly new to science, but it has never been seen in flower, and we do not know enough about it to properly state its characters. Schedin's White-streaked Rose (*Rosa nutkana schedinorum*) was recently described by Payson from specimens collected near Leadville, at an altitude of 10,300 feet. The petals have a white stripe from the base to the middle of the deep notch. The exact relationships of the variety are obscure, and it may not belong with genuine *R. nutkana*. The Castle Rock Rose (*R. angustiarum*) was found up Boulder Canyon, at 7,340 feet, and later on Wood Mountain. It is generally regarded as a variety of the Prairie Rose, common on the plains, but its exact status is unknown. These are only a few of the problems awaiting a Colorado rhodologist; many others will come to light with a little investigation. Another complex group of very

beautiful plants is *Delphinium*, the larkspurs. The closely allied species or races are numerous, and there is much disagreement regarding their status.

Reviewing the Colorado flora, it is impossible in this place to do more than allude to a certain number of the more interesting species, grouped under the principal families.

Pinaceae (Pine Family). Along the foothills the Rock Pine or Yellow Pine is very conspicuous, covering many of the ridges. The leaves are in bundles of two or three. This tree was first named by Engelmann in 1848, as *Pinus brachyptera*, from the mountains of New Mexico, but is generally known as *P. scopulorum*. It is regarded by many authorities as a geographical form of the larger Bull Pine of the Northwest, in which case it takes the name *P. ponderosa brachyptera*. The Bristle-cone Pine (leaves in bundles of four or five) and the Lodge-pole Pine (with persistent cones) are common in the mountains. The Limber Pine, which goes to high altitudes, is placed by Rydberg in a distinct genus (*Apinus*) ; it has the cone-scales without spines, and the seeds have only rudimentary wings. The leaves are in bundles of five. The small, usually round-topped Pinyon Pine, with large edible seeds, is characteristic of though not confined to the southern part of the state. The leaves are in twos, rarely in threes. On account of the edible fruit, Engelmann named it *Pinus edulis*.

The Douglas Fir (*Pseudotsuga*), one of our commonest trees, is easily known by the downwardly directed cones, with sharply three-toothed bracts from under their thick scales. The Balsam Fir (*Abies lasiocarpa*) is also a common tree, recognizable by the smooth branches and erect cones. The true spruces (*Picea*) have rough branches, from the persistent leaf-bases. The "black timber" of our high mountains consists mainly of Engelmann Spruce (*P. engelmanni*), which has pubescent branchlets. It is a tall and splendid tree, and an exceptionally fine example in Boulder Canyon is pointed out to visitors as the "perfect tree." The Blue Spruce (*P. pungens*), with glabrous branchlets, is frequent in gulches, and gets its name from the prevailingly bluish color of the foliage. This character

is very variable, and not reliable as a means of distinguishing the species. The looser, more or less reflexed scales of the winter buds afford a better criterion, the scales of the Engelmann Spruce buds being appressed. Some very fine horticultural varieties of the Blue Spruce have been selected or developed.

Juniperaceae. The so-called cedars, with berry-like fruits, belong to the genus or subgenus *Sabina*, and have nothing to do with the true cedar of Lebanon. They are in fact large junipers.

Poaceae (Grass Family). The Colorado grasses are of course very numerous, and one of our principal sources of wealth. We have about 270 species. There are also many sedges (*Cyperaceae*) and rushes (*Juncaceae*).

Liliaceae (Lily Family). The Mountain Lily or Sand Lily (*Leucocrinum*), with white flowers, appears in open places early in the year, the flowers developing under ground. Of the true lilies we have one species (*Lilium montanum*), usually found in aspen groves; an upright plant with red flowers, resembling the red lily of the Eastern states, of which it is sometimes considered a variety. The Dog-tooth Violet (*Erythronium*), with bright yellow flowers, is also a member of the lily family, and of course quite unrelated to the true violet.

Calochortaceae. Here belongs the lovely Mariposa Lily (*Calochortus gunnisonii*), which in Colorado gets as far east as our foothill country, being an outpost of a genus richly represented on the Pacific coast. Its most easterly limit is reached in the Black Hills of South Dakota.

Iridaceae. The light blue *Iris missouriensis*, our only species, often imparts a delicate splendor to damp meadows.

Orchidaceae (Orchid Family). Many species, of which the most interesting are the Rocky Mountain Ladies' Slipper, with large deep yellow lip, and the much smaller pink-flowered Venus' Slipper or Calypso.

Salicaceae (Willow Family, including Poplars and Aspens). The Quaking Aspen is one of the best known trees of the mountains, especially characteristic of the Canadian Zone. The leaves turn a beautiful golden yellow in the fall, which led Tidestrom, who thought our tree distinct from that of the Eastern states, to propose the

name *Populus aurea*. Occasionally we meet with small groups of aspens in which the autumn color is much deeper and richer than usual, almost red. Whether these could be propagated as a distinct horticultural variety is not known. The large cottonwood with broad leaves, so common in the foothill country, and much planted in towns, is called *Populus sargentii*, after Doctor Sargent of the Arnold Arboretum in Massachusetts. The narrow leafed cottonwood (*P. angustifolia*) was discovered on Long's Expedition, and named by Edwin James, botanist to that expedition.

Fagaceae (Beech Family, including oaks). The distribution of oaks in Colorado is peculiar. On the western slope they extend as far north as Wyoming, but in eastern foothills they fail to reach Denver, though extremely abundant at Colorado Springs. There are accordingly no native oaks in the vicinity of Boulder, Fort Collins, Lyons or Greeley. It seems probable that they were exterminated in this region during the ice age, and have never regained a foothold. In some parts of the state the oak leaves turn bright red in the fall, contrasting with the yellow of the aspens, and the deep green of the conifers, making a picture hardly to be excelled for brilliant coloring.

Nymphaeaceae. A yellow water-lily (*Nymphaea polypetala*) may be found in our mountain lakes, as in the neighborhood of Ward.

Ranunculaceae (Buttercup Family, including columbines, larkspurs, monkshood, anemones, meadow-rue and clematis). We have several native species of true *Anemone*, but the plant more often called by that name is the Pasque-flower, which appears early in the spring and is a favorite with everyone. It is so closely related to an Old World species that Asa Gray considered it only a variety. The magnificent blue-flowered columbine, *Aquilegia caerulea*, discovered on Long's Expedition, is the State flower of Colorado. In the Roan Mountains and elsewhere on the western slope, the flowers of this species are nearly always white, only rarely blue. Those who will climb to certain of our mountain summits, as the Twin Sisters near Estes Park, will be rewarded by finding the dwarf blue columbine (*Aquilegia saximontana*), a pygmy plant of exceeding

delicacy and beauty. It may be successfully cultivated at lower levels by planting it on the north side of the house.

Berberidaceae. The Barberry Family includes the familiar so-called Oregon Grape, with holly-like leaves and small yellow flowers. It blossoms on dry hillsides and in the woods early in the year.

Papaveraceae. Our conspicuous species are the Prickly Poppies (*Argemone*), with large white flowers. We have two common sorts, to be seen by roadsides in the foothills. In the very high mountains, as for instance on Arapahoe Baldy, a great prize, to be sought for among the rocks, is the dwarf true poppy (*Papaver*), with yellow or orange flowers. It is a close relative of the much larger Iceland Poppy, which is well known in gardens.

Brassicaceae (Cabbage and Mustard Family). We need notice only the so-called Wild Wallflowers (*Cheirinia*), which may be found from the foothills to above timber line, the flowers reddish-brown to clear yellow. There are several species, but they are closely allied, and the plants are in fact relatives of the garden wallflowers.

Capparidaceae. Here belongs the Colorado Bee-flower (*Cleome*), frequent at lower altitudes, and a great favorite with honey-bees and wild bees. The insects often gather loads of the green pollen on their legs.

Grossulariaceae. We have many kinds of wild currants and gooseberries. The golden currant (*Chrysobotrya*), with long-tubed yellow flowers, is one of the most ornamental, and is much planted in gardens.

Rosaceae (Rose Family, including the cinquefoils, wild strawberries, avens and raspberries). There is a member of the raspberry group (*Oreobatus deliciosus*), which is of no value for its fruits, but has very large and handsome white flowers. In the mountains a genuine red fruited raspberry is abundant. The wild roses are many, as we have stated above.

Malaceae (Apple Family). Here belong the various hawthorns (*Crataegus*), abundant in the foothills.

Fabaceae (Bean and Pea Family, including loco-weeds, lupins, clovers, vetches, alfalfa, and many other familiar plants). This is one of the largest groups in the Colorado

flora, many of the species being closely allied and hard to classify accurately. The Golden Pea (*Thermopsis*) is one of the conspicuous early flowers, and is much visited by wild bees. White sweet clover (*Melilotus alba*) has been introduced from Europe, and has become very abundant along roadways and in waste places. It is a favorite with the honey bee. The common loco-weeds, said to cause craziness (Spanish, loco) in stock, belong to the genus *Oxytropis*.

Linaceae. The tall blue flax (*Linum lewisii*) recalls the Lewis and Clark Expedition.

Euphorbiaceae. The one conspicuous species is the snow-on-the-mountain, which often grows in draws near the edge of the plains, and from a distance gives the illusion of drifted snow, during the season of the year when the real snow has long disappeared. The round seeds are very hard, and those of closely related species have been preserved as fossils, testifying to the antiquity of this type of plant in this region.

Aceraceae. The small mountain maple (*Acer glabrum*) is very attractive. The leaves are often blotched with bright red, the effect of the work of a parasitic mite. The Box-elder, growing in river valleys, is really a kind of maple.

Violaceae. We have many violets. In the spring we often see the little yellow violet (*Viola nuttallii*), the name of which commemorates Nuttall, a famous naturalist who explored the West in early days. Going on foot long distances, he could only carry a certain amount of material; hence his specimens, still preserved, are often very small. When he could, he collected seeds, and raised the plants after his return.

Loasaceae. Nuttall is also remembered in the name *Nuttallia*, the genus which includes the Blazing Star, Western Star, or *Mentzelia*. These often bushy herbs have curious hairs with little barbs or hooks, the whole structure suggesting the form of a Chinese pagoda under a microscope. If a twig or leaf is placed on a coat, it adheres by means of these hairs, hence the children call it love plant. Several of the species, with cream colored flowers, open in the evening, attracting large night-flying moths.

Cactaceae. The Colorado cacti are not gigantic, as are some of the species of Arizona and Mexico, but there are many kinds, with handsome flowers of various colors. The cylindrical-jointed branching *Opuntia arborescens* is common in the region about Pueblo. It was originally discovered at Wagon Mound, New Mexico, by Dr. A. Wisslizenus on his trip from Missouri to El Paso, in 1846.

Onagraceae. The common Evening Primrose of the region about Boulder (*Oenothera cockerellii*) is one of those used by the Dutch botanist deVries in his well-known experiments. He has crossed it with many other kinds, with very interesting results.

Primulaceae. The splendid *Primula parryi*, which grows along streams at high altitudes, is one of the finest of our wild flowers. The shooting-star (*Dodecatheon*) looks very different, but belongs to the same family.

Gentianaceae. The Colorado gentians are numerous and very attractive. Perhaps the finest is the Fringed gentian, which Nelson named *Gentiana elegans*. It was discovered that a European botanist had earlier called it *G. thermalis*, having before him some diminutive specimens which he supposed to belong to a different species. I have found such dwarfs near Long's Peak Inn, but they certainly belong to the ordinary Fringed Gentian.

Convolvulaceae. The Wild Morning-glory of the plains (*Ipomoea leptophylla*) is remarkable for its enormous underground parts, the structure comparable to a gigantic sweet potato.

Polemoniaceae. The blue-flowered species of *Polemonium*, and the various kinds of *Phlox* and *Gilia* add greatly to the beauty of mountain valleys and hillsides. Some kinds of *Polemonium* are called Skunk-weed, on account of the heavy odor, recalling that of a skunk.

Boraginaceae. To this family belongs the bluest of blue flowers, a sort of dwarf forget-me-not, confined to the highest altitudes, growing abundantly above timber line. Botanists know it as *Eritrichium argenteum*. Sometimes the flowers are white.

Solanaceae (Potato Family). The exceedingly prickly yellow-flowered Buffalo-bur (*Solanum rostratum*) is

famous as the original food-plant of the Colorado Potato-beetle.

Serophulariaceae. Here belong the variously colored Paint-brushes (*Castilleja*), the bright colors due to bracts, and not to the true flowers, which are relatively inconspicuous. They are attractive to humming-birds. Also in this family are the Beard-tongues or Pentstemons, very conspicuous plants suggestive of the snapdragon, mostly with bright blue flowers.

Cucurbitaceae. The wild gourd (*Cucurbita foetidissima*) is common on the plains.

Campanulaceae. The common harebell (*Campanula*) is only slightly different from that of Britain.

Carduaceae or *Compositae* include the sunflowers, asters, so-called sage, everlasting, goldenrods, thistles and a multitude of other plants. What we call the flowers are really assemblages of minute flowers or florets in a head.

The Colorado Rubber-plant (*Hymenoxys floribunda*), found in dry upland places, was at one time regarded as a possible source of commercial rubber. It is true that rubber may readily be extracted from it, but not in sufficient quantity to be commercially profitable under present conditions. The Blanket-flower (*Gaillardia aristata*) has been taken into cultivation, and the improved garden varieties are greatly esteemed.

Cichoriaceae (Chicory Family). Here belongs the too-familiar dandelion, which takes its name from the French dent de lion, or lion's tooth, based on the tooth-like margins of the leaves. Here also is the wild lettuce (*Lactuca*), a blue-flowered species being common. The cultivated plant belongs to the same genus.

FERNS AND THEIR RELATIVES (PTERIDOPHYTA)

Ferns have long existed in Colorado, as is proved by the many fossil remains. Some of those from Florissant are beautifully preserved, showing the minute details of structure. In those early times the climate was evidently moister, and better adapted to fern life; the species found today must represent but a remnant of the former flora. In all, about 25 kinds have been collected, these including

the Polypody, Woodsia, Bracken, Parsley-fern, Spleenwort, Male-fern, Lady-fern, etc. The most interesting is the species discovered by Mr. D. M. Andrews on rocks in the vicinity of Boulder. It was sent to Prof. Aven Nelson, who saw that it was different from anything known in America, and named it *Asplenium andrewsii*. Now it turns out that it is practically impossible to separate it as a species from *A. adiantum-nigrum* of the Old World. The circumstances of its occurrence make it in the highest degree improbable that *A. andrewsii* was introduced by man, and we can only assume that it once existed over the greater part of the country, and had become extinct, except for a small colony in Colorado. The case recalls that of the giant trees (*Sequoia*) which once abounded in Europe, Asia and America, and now survive only in a small area on the Pacific coast. The Brake-fern or Bracken, so familiar in Britain, may also be seen in aspen groves in Colorado. The Rocky Mountain variety is rather different from the typical form, and was named *pubescens* by Underwood. Linnaeus named the bracken *Pteris aquilina*, the specific name meaning, of the eagle. This is at first puzzling, but cut a section across one of the stalks, and you will see the eagle. Not all ferns live in moist situations; there are certain genera adapted to very dry rocky places. We have some of these in Colorado, and I found a related form in an excessively dry place near Arequipa, Peru.

The curious moonworts (*Botrychium*) have three Colorado species, but they are uncommon. The *Marsilea* or Pepperwort, looking something like four-leaved clover, is recorded from Saguache, and Mr. D. M. Andrews found it near Boulder. Of Horsetails (*Equisetum*) we have four species, and the antiquity of the group is attested by fossils. There are two kinds of Quillworts (*Isoetes*), and forms of Clubmoss (*Lycopodium* and *Selaginella*).

LOWER FLOWERLESS PLANTS

As long ago as 1874, Leo Lesquereux, who specialized in mosses and fossil plants, listed about 125 different kinds of mosses from Colorado. The largest genus was *Hypnum* (in the old broad sense), with twenty-two species and

varieties. Next came *Bryum*, with ten. Since that time other species have been added; thus Lesquereux recorded only one species of *Sphagnum* or Peat Moss, whereas today we know seven. The specimens recorded by Lesquereux came from such localities as Platte River near the mountains, Glen Eyrie, and Twin Lakes. More recently, Holzinger collected on Pike's Peak and near Breckenridge, and other collections have been obtained at various points; yet it is certainly true that many localities where mosses might be found have yet to be examined.

Six fossils from Florissant have been described as mosses, but of these one proves to be a feather, and another a fragment of a redwood tree. These mistakes were made by Lesquereux, notwithstanding the fact that he knew living mosses. Some of the more recently described fossils are mosses without any doubt.

Fifteen species of Liverworts were recorded, without precise localities, in the Report of the Wheeler Survey. One of these, the common *Marchantia polymorpha*, I have myself collected in Custer and Routt counties. I have not undertaken to assemble the more recent records. A fossil liverwort (*Jungermanniopsis cockerellii*) has been found at Florissant, and another (*Lejeunea eophila*) in the Green River shales near DeBeque.

The Colorado lichens are numerous, and often very beautiful. The older records are those of Henry Willey (1874) and Tuckerman (1882), the lists including sixty-seven species. To these I was able to add *Peltigera horizontalis* (from Naomi, in Summit County), *Icmadophila* (or *Baeomyces*) *icmadophila* (from Swift Creek, Custer County) *Placodium miniatum* (Custer and Pueblo counties), *P. variabile* (Custer County), and *Collema laciniatum* (Summit and Custer counties). *Alectoria jubata*, collected in Boulder County, was reported by Howe in 1911. We may suppose that most of the species have been recorded in one place or another, but the detailed distribution has yet to be worked out. Those who wish to study our lichens will find descriptions and excellent photographic figures in Fink's *Lichens of Minnesota*, published by the U. S. National Museum in 1910.

Much attention has been paid to Colorado fungi, yet the

subject is very far from being exhausted. Charles H. Peck recorded three agarics (toadstools) from Twin Lake Creek in 1874, and in 1904 described four species collected by E. B. Sterling, mostly at Denver. Much more recently, L. O. Overholts has collected and studied Colorado fungi; in one paper, published in 1919, he reported 152 species. In general, the fleshy fungi and polypores are very similar to those of the Northeastern states, and peculiar or endemic species appear to be much less frequent than in the Pacific coast region. Two new species of *Russula* and two of *Clitocybe* were described from specimens collected by Overholts at Tolland. Many fungi have been collected by Clements on Pike's Peak, while the extraordinary richness of the Rocky Mountain region in rust-fungi was made known through the arduous labors of Bethel. Not only did Bethel make known the existence of very many species, but he investigated their life histories, coöperating with Doctor Arthur, the greatest authority on this group.

In 1912 (*University of Colorado Studies*), W. W. Robbins published a preliminary list of the Algae of Colorado, 143 species in all. Several hundreds will probably be added eventually. In 1911 C. H. Edmondson collected Desmids in the high mountains, at Summit Lake (12,740 feet), James Peak (12,500 feet), and Corona (11,660 feet). These were determined by G. H. Wailes, and found to include nineteen species. Although Robbins had recorded thirty-six Colorado species of Desmidiaceae, no less than sixteen of the nineteen reported by Wailes were new to the list. We can only infer that further collecting in the same region would result in numerous discoveries. A fossil alga (*Chara peritula*) is found in the Miocene shales of Florissant.

Sixteen species of bacteria, mostly pathogenic (disease-producing), have been identified in Boulder to my knowledge, but no one can tell how many exist. The soil bacteria, the fresh-water forms, the species associated with various animals and plants, all await detailed study and identification. During the war, those who had occasion to go into the canning of fruits and vegetables on an extensive scale discovered that we had certain bacterial forms which were

extremely hardy and difficult to destroy. In New Mexico it has been found that even the air in arid mountain regions carries bacterial spores of many species, and the same is undoubtedly true in Colorado.

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CHAPTER V

ANCIENT INHABITANTS

By Jean Allard Jeançon

OBJECTS OF QUESTIONABLE ANTIQUITY—PREHISTORIC CULTURES AND THEIR LOCATION—CULTURES—ARCHITECTURE — AGRICULTURE — ARTIFACTS — BURIALS —ANTIQUITY OF THE RUINS—ARCHAEOLOGISTS AND EXPLORATIONS IN COLORADO—BIBLIOGRAPHY.

The question of the antiquity of man on the American continent is one that has been fought over time and again and as yet no satisfactory solution of the question has been obtained. Colorado, like all of the other states, presents the same field of conjecture as to how long ago man existed within its borders and many problems that do not appear to be likely of early solution have been encountered. From time to time objects of apparently great antiquity have been found and presented to qualified scientists, but sufficient data, directly associated with the objects themselves, has not been obtained to permit even a surmise as to the genuineness of the finds. Reports of discoveries of artifacts, sculptures, petroglyphs and many other things are received and where possible an investigation has been made, but without any satisfactory result so far.

If there really was a human occupation of this continent at a remote period, it does not seem logical that Colorado should not have been included in this occupation. The mountains would have afforded an ideal place for people of a timid disposition, the plains, great stretches for hunters and nomadic tribes, and if there were agriculturists amongst them, there were ample fields, with good water, to permit of as extensive operations in that line as they could have desired. However, the question is still to be answered as to the remote occupation of the State by

human occupants. No fossil human remains have been found, although great numbers of such fossils of animal origin are scattered in many places within our borders.

OBJECTS OF QUESTIONABLE ANTIQUITY

Amongst the most remarkable inexplicable objects of supposed remote antiquity are two stone sculptures. One of these was found in the fall of 1922 by Mr. W. L. Chalmers on Willow Creek, near Grand Lake, Colorado. The height of the stone is fourteen inches, width nine inches across the tablet, and the depth about twelve inches from front to back. It is carved from a blue granitoid boulder and represents a human figure, squatting on its haunches and holding a tablet upon which are inscribed strange hieroglyphs; on the back and sides, in high relief, are carved the figures of a mastodon, saber-toothed tiger, and two distinct types of dinosaurs. These are very graphically portrayed and show a great deal of knowledge of the forms of the animals mentioned. The human face is similar to that portrayed in Osborn's *Men of the Stone Age* and designated "Cro-Magnon." The deep depression of the upper part of the nose is typically protonegroid and has been found in some of the skulls of a later period from the pit-house remains of the Pagosa-Piedra region of Southwestern Colorado. The pointed ears are rather unusual and may be a grotesque portrayal of that part of the head.

While the rock bears a definite patina from being buried for a long period and there is no appearance of chisel marks of any kind, yet the fact that prehistoric animals of different geological periods appear upon its surface detract from its value and cause doubts to arise as to its authenticity. It was found in a yellow clay bed of an undated age.

The second example of doubtful origin is a huge boulder found near Rush, Colorado, having one side of it smoothed off and carved, in high relief, to represent a human face. This stands about four feet in height and is very crudely done. The face is more of an Indian type and somewhat

resembles an Arapahoe Indian and may have been of the period when these occupied that section of the country.

Scattered all through the state are petroglyphs, some of undoubted Ute origin, and many others whose origin is purely conjectural. In a report on the country around Monte Vista, South Central Colorado, Captain Berthoud mentions petroglyphs in that vicinity to which he ascribes a remote antiquity, but after an examination it is safe to say that he was mistaken in his determination, as many of the glyphs are of Ute and Jicarilla Apache origin and some have even been identified by Utes who are living today. (Jeançon report for 1924, unpublished.) There is not a character in the whole group that would indicate any remote antiquity and in some cases horses and firearms that are portrayed show that they were made since the coming of the white man.

The cliff upon which they are carved is the termination of Ute and Apache trails into the San Luis Valley, where these Indians came to hunt antelope and perhaps even buffalo, as the latter animal is known to have roamed that section of the state.

The petroglyphs on cliffs along the Purgatory River below La Junta, Colorado, are all of modern origin and more than likely were made by the Comanches and Kiowas, although a remote antiquity has been ascribed to them. And the same might be said of the majority of petroglyphs in most parts of the state, the exceptions being those found in the southwestern corner, and which are associated with cliff and pueblo remains of the prehistoric periods.

From time to time minor antiquities in the form of arrowheads, and spear points, etc., have been brought to light which differ slightly from the more recent ones, and here again we have the same question of unauthenticated antiquity. It has been repeatedly suggested that as the Indians of today do not appear to know the technique of chipping used by the ancients that a different people made these stone objects. This is not true, as many of the older men amongst the Utes, Apaches and Pueblos still retain the art of chipping in the highest degree and are able to make just as fine specimens as those found in the prehistoric ruins. Stone chipping or flaking is not a lost art.

PREHISTORIC CULTURES AND THEIR LOCATION

Coming down to prehistoric remains which have been more or less identified and classified, we reach a field that leaves much to be desired, but which is not as vague as that of the periods that preceded it. Our best archaeologists have tentatively placed the cultures, of which we have some knowledge, in four groups or classes. The writer says "tentatively," for we have only a limited knowledge of these things and there is still more to learn than what we already know. These four classes are: the first, or oldest, known as the Basket-Makers; the second, the Post Basket-Makers; the third, the Pre-Pueblo; and the fourth, the Pueblo-Cliff Dweller. All of these are of the prehistoric periods, and while there appears to have been some sort of connection between the Post Basket-Makers and the Pre-Pueblos yet there is enough difference to suggest putting them in separate periods. The fourth period embraces the so-called Cliff Dwellers, as this was one phase of that culture.

The surveys of 1923-24 made by the State Historical and Natural History Society show that there is an area of approximately 7,000 square miles containing ruins in Southwestern Colorado. Beginning on the east at a point just below Pagosa Springs (South Central Colorado) and extending west to the Utah border, a distance of 125 miles, and varying from thirty to forty miles in width; and starting from the New Mexico border (in the extreme southwestern corner of Colorado) and extending north to within about sixty miles of Grand Junction, a distance of 145 miles, by twenty-five to thirty miles in width, we have the area containing the remains of the prehistoric peoples who formerly dwelt in our State. Of course this does not mean that every square mile of this area contains ruins; it does mean, however, that there is a much larger territory in which ruins are to be found than was ever supposed before. It also means that there are a very large number of important sites that have not been touched by the excavators nor have even been studied enough to more than place them in a tentative place in the chronology of the different cultures.

There are only two places in Colorado where we have definite Basket-maker sites. One of these is in the neighborhood of Sinbad (Western Colorado), sixty miles below Grand Junction. One typical Basket-maker's cave has been reported from here and is high up in the walls of a cañon. In the cave were the mummified remains of a child about twelve years old, accompanied by some other typical Basket-maker objects. The mummy was wrapped in cedar bark.

The second location is in Moffat County and consists of caves containing corn caches and material similar to that found in Basket-makers' caves in Northeastern Arizona. The extent of the area containing these caves is not known, as so far there has been only a most superficial survey of the country. It appears, however, from this brief survey that there are many such caves, especially in the extreme northwestern corner of our State. This is probably an overlapping of the Basket-maker culture area of Northeastern Utah.

Evidences of this culture are to be found in practically all of the area from the San Juan River, on the east, to the Utah border on the west. The width of this strip varies from twenty to thirty miles and its length is about 120 miles. In the Pagosa-Piedra region especially there seems to be a blending of the Post Basket-maker and the Pre-Pueblo periods. In fact these are so closely similar in artifacts and other features that, at times, it is difficult to distinguish where one ends and the other starts.

We find the ruins of the Post Basket-maker period in the same territory as that of the previous one and extending, on the west, as far north as to within about 100 miles south of Grand Junction. The Pagosa-Piedra region, the Montezuma Valley, Johnson Cañon, the Paradox Valley and Disappointment Valley all contain, more or less, sites of these ruins.

There are a few excellent examples of the prehistoric pueblos in the Pagosa-Piedra region, and as one progresses farther west the number of these increase until in the Montezuma Valley, the Mesa Verde, and all along the Colorado-Utah border they are in large numbers. The Cliff Dweller or "pueblo in a cave" type is mostly found

on the Mesa Verde and the adjacent cañons. One other type might as well be included in this group, namely: the towers, circular and rectangular, of the McElmo cañon and the vicinity. These belong to a late phase of the Pueblo-Cliff Dweller culture.

There are three questions which naturally arise as we study the remains of the prehistoric peoples: Who were they; why did they leave their homes; and what finally became of them?

In answer to the first, the best informed archaeologists agree that they were Indians who probably came into the country, at different times, from the far north principally, but also, in some cases, from the south; possibly, as in the case of some of the Basket-makers, from Mexico.

When the ruins of Southwestern Colorado were first seen and examined by non-scientific persons a wrong impression was obtained as to who the builders were and the name of "Aztec" was given them. Careful research has definitely shown that there was no connection between the Aztec of Old Mexico and the Indians who built the ruined villages of Southwestern Colorado; therefore the name has been applied erroneously.

In speaking of the former inhabitants of the Mesa Verde, Dr. J. Walter Fewkes says: "The people were farmers, timid, industrious and superstitious. The women were skillful potters, and made fine baskets. The men made cloth of good quality and cultivated corn, beans, and melons. In the long winter evenings the kivas served as lounging places for the men, who were engaged in an almost constant round of ceremonies of dramatic character, which took the place of pleasures of the chase. They never ventured far from home and rarely met strangers. They had all the unsocial characteristics which an isolated life fosters.

"What language they spoke and whether various Mesa Verde houses had the same language, at present no one can tell. The culture was self-centered and apparently well developed."¹

¹ J. Walter Fewkes, *Antiquities of Mesa Verde Park. Spruce Tree House* (Bureau of American Ethnology, Bulletin 41), 53.

There has been and still continues to be an erroneous belief that these people were of small stature, and some very foolish theories and stories have been used to prove this. However, careful measurements of many skeletons have proven that they were not small, dwarfs or pygmies, but of an average stature of five feet to five feet eight inches for the male adult, and a little under this for the female. There have even been found skeletons that are much larger, but these are not common.

A comparison of the physical structure of the Indian of today and of the skeletons of the prehistoric people, establishes beyond a doubt that the latter were also Indians and that their descendants, in a modified form, still live in the modern pueblos.

The various reasons for the abandonment of the villages do not present any great mystery. Within historic times we have many examples of the abandoning of a village for the same causes that doubtless caused the desertion of prehistoric sites. Superstition, witchcraft, interneccine strife, failure of a favorite spring, aggrandisement of one clan to the detriment of the smaller ones, pressure from enemies on the outskirts of the culture—all of these unquestionably entered into the reasons for leaving. There is positively no reason to suppose that they were destroyed by any volcanic action or noxious gases. There are no evidences of any great cataclysm of Nature; no overwhelming wave of destructive force either human or natural overtook them. The stories of finding ruins under lava flows have never been verified and are the results of careless investigators who did not distinguish between villages destroyed by fire from internal causes and what their vivid imagination pictured to be volcanic evidences.

After the departure from the mesa and cliff dwellings there followed a period of wandering by the remnants of the people. These wanderings lasted over a more or less extended period and were broken by settling and building of pueblos in various places in the states of Utah, Arizona and New Mexico. Some of these settlements were occupied for quite long periods and others for shorter times. The constant urge for better fields, and better living conditions, and other reasons kept them more or less on the move, and

as labor counted for very little with them, the building, occupying and deserting of a village would not be a matter of great importance.

All the present day Pueblos have traditions of having lived, at one time or another, in the villages and cliffs of Southwestern Colorado. The Tewa of the Rio Grande know the Montezuma Valley almost as well as their present location in the Rio Grande Valley, and have place names, in their own language, for many of the ruins. All of their stories tell of reaching the Montezuma Valley after a long pilgrimage from the far north with its ice and snow. The writer has had the good fortune to have made a special study of the more recent prehistoric migrations of the Tewa and has been able to verify many of the stories by the almost continuous line of ruins extending from Aztec, New Mexico, to the Valley of the Rio Grande. With only a small break in the continuity of the ruins, the Tewa have been traced back to some of their former places of occupation in the Montezuma Valley.

Zuni traditions carry them back to the ruins in Chaco Cañon and even much farther north, in one or two cases reaching the border of Southwestern Colorado. Mr. Frank Hamilton Cushing in his paper on *Zuni Creation Myths* speaks of the tradition that the people who lived in the cliffs made excursions to the salt lake still used by the Zuni, to gather the salt, and that they built a line of towers along the road to be used as temporary shelters as the pilgrimage was made; these towers eventually took on the form of small towns and the line was extended to some of the locations of the older Zuni towns. As the evacuation of the cliffs proceeded, the towns to the north were gradually abandoned and the southern settlements grew larger.

The following quotation is from his report:

According to all these tokens and evidences, one branch of their ancestral people was, as compared with the other, aboriginal in the region comprising the present Zuni country and extending far towards the north, whence at some remoter time they had descended. . . . Considering both of these primary or parental stocks of the Zuni as having been thus widely asunder at first, the ancestral relations of the aborigines or northern branch probably ranged the plains

north of the arid region of Utah and Colorado ere they sought refuge in the desert and canons of these territories. . . . There is abundant reason for supposing that the "elder people" these people whom they "overtook" . . . were direct and comparatively unchanged descendants of the famous cliff dwellers of the Mancos, San Juan and other canons of Utah, Colorado, and northern New Mexico. The evidences of these are numerous and detailed. . .²

Mr. Cushing gives an exhaustive resumé of the corroborative data as furnished by tradition, similarity in buildings, specific nomenclature for rooms, objects and other things which could only be applied to cliff dwellings and their remains, and also place names of regions in the cliff dweller area.

Dr. J. Walter Fewkes has regarded the Hopi as being the least modified descendants of the prehistoric people of Colorado. He has secured a great mass of evidence to prove his statements. Tradition, cultural similarities, certain definite knowledge of ruins which they have never seen and many other things amongst the Hopi all go to prove that they really did come from the regions of Southwestern Colorado and the adjacent country.

With reference to the desertion of the Mesa Verde Doctor Fewkes says:

An answer to the last and most difficult of all questions, What became of the inhabitants? . . . The writer has held that the cliff dweller constructed a pueblo after he abandoned the caves and believes man later moved to the valleys, where his culture still survives. This culture is most apparent amongst the least modified pueblos as the Hopi. . . . These Hopi legends and similar stories found among the pueblos are supported by many facts besides architectural and ceramic resemblances. . . . Not the least important fact supporting this statement is the identity in artifacts among the two people.³

With all these evidences at hand we cannot make a mistake by saying that all of the Pueblos as they exist today have a strain of the cliff dweller blood in them, and while this has been more or less modified, still the fact

² Frank Hamilton Cushing, *Zuni Creation Myths*, 13th Annual Report, Bureau of American Ethnology, 342-343.

³ J. Walter Fewkes, *A Mesa Verde Pueblo* (Annual Report of the Smithsonian Institution, 1916), 485-486.

remains that some of their ancestors originally came from the cliffs. That they are a completely vanished race is therefore not true.

CULTURES

One of the duties of an archaeologist is to reconstruct, from evidences at hand, by tradition, and by comparisons with modern peoples, the life customs and manners of the pre-historic races that have passed on to the "Great Beyond." House remains, artifacts, ceramics, skeletal material and many other things help in reconstructing the days of the vanished ones. If an object is found that is still in use by tribes living in the same or adjacent territories; if certain architectural features are observed in the ruins; if design elements of a ceremonial character are discovered that can be interpreted by the living Indians, we have a good basis upon which to depict the lives of the pre-historic peoples, and as such has been the case in the history of archaeological research in Colorado, we are able to draw a picture of the lives, manners and customs of the early inhabitants of our State.

There are two primal facts that must always be borne in mind in our reconstruction, and these are: that the people who inhabited our pre-historic ruins were Indians; there is not a single scientific fact that would bear out the theory that they were Caucasian, such as Welch, Scandinavian, or any other white people. The second fact is that they were not destroyed by any great cataclysm of nature such as an earthquake, volcanic action or noxious gases. Physically they are more closely related to the present day Pueblo Indian than to any of the remaining Indians of the Southwest, and therefore one may say that they are their ancestors; but this must be qualified also by the statement that the present day Pueblo Indian is not pure blood, having married in some cases quite extensively with Navajo, Ute, Apache and other captives and thereby introducing a foreign blood strain.

The matter of abandoning their homes in the cañons and on the mesa tops and in the valleys has already been discussed. With these facts in mind we will attempt to

give a true picture as far as is possible under the circumstances.

The Pueblo Indian is naturally a gregarious creature, and as such has from time immemorial gathered in groups, large or small, the numbers often controlled by the size of the clans and their relations. It is safe, from present indications, to say that the pre-historic peoples had a similar social system such as the clan. While the earliest types of ruins appear to indicate that each family had its own domicile, more or less detached, yet these detached dwellings always formed a settlement or village and appear related to one another. Therefore these villages of detached houses undoubtedly were the first form of the later compact, huddled masses known as pueblos.

Of the real Basket-maker we know very little. From evidences found in Southeastern Utah and Northeastern Arizona we know that he practised agriculture, probably on a small scale. The corn is small and only of one variety. From the reports of Doctor Kidder and Doctor Guernsey on that region, we may also say that he was a hunter. House building probably consisted of brush shelters for the summer and others built of logs covered with mud for the winter house. This type of dwelling is the same as that still used by the Navajo Indian. It must be borne in mind that there were no conveniences such as we have at this day and age, and that most of their lives were spent in the open without any great amount of shelter. The brush wickyup and the log house were simply places of refuge against the broiling sun in the summer and against the cold of the winter months. The ground afforded a convenient place to sit down, and mats or mother earth composed their beds. Cooking was done over an open fire or on a spit of wood. Stews were concocted in baskets, as pottery was then unknown. The basket was not set directly above the flames but the liquid contents was heated by throwing hot stones into it, thus causing the temperature to rise and the food to boil. This method is still followed by many of the California Indians.

Dr. A. V. Kidder, of Harvard University, gives the following brief comment upon the Basket-maker culture:

"This culture, as reported by Pepper, differed from

that of the Cliff dwellers in various particulars: skull deformation was not practiced; houses were round, subterranean chambers; the atl-atl was used to the apparent exclusion of the bow and arrow; pottery was rare, crude, and basket-marked; basketry, on the other hand, was extremely abundant. Our investigations served to confirm most of these statements; we have also been able to add to the list a number of other differences. * * *⁴

While the best evidences show that they only occupied the caves as temporary shelters, yet they were used for mortuary purposes and practically all of the material remains of this period were found in graves in the caves. Many of the burials were made in bottle-shaped pits excavated in the rock floors of the caves. The bodies were accompanied by mortuary offerings of several different kinds.

The atl-atl, or throwing stick, was the distinctive weapon of this and the Post Basket-maker periods. While the distribution of the atl-atl is very great, extending north from Old Mexico and spreading as far east as Florida and north along the Pacific coast to Alaska, yet it appears to have been the one outstanding weapon of the Basket-maker. So far the bow and arrow have not been found in Basket-maker graves or caves.

While the Basket-maker did not know the art of weaving as demonstrated in the later periods of the Pueblo-Cliff Dweller yet they made nicely twisted bags both of yucca and a soft, cotton-like material which Dr. Kidder calls "apocynum." Human hair was also used for making cords incorporated in sandals, tie strings in hair-dressing and other uses suited to it.

One other feature is distinctive of the Basket-maker period, that is the square-toed sandal. A large variety of material was used in making these.

While the Post Basket-maker has been put into a separate period it is more than likely only a continuation or growth of the former one. In it we still have most of the prominent features of the preceding culture, but with the

⁴ A. V. Kidder and S. J. Guernsey, *Archaeological Explorations in Arizona* (Bulletin 65, Bureau of American Ethnology, 1919), 204.

addition of crude pottery and the use of feathers (down from the breasts of large birds) as well as of rabbit fur in the making of robes for body coverings and burial purposes.

There are many sites in Colorado that from the material remains appear to place them in the Post Basket-maker period. In one of the caves on the western side of the Mesa Verde, and under Cliff Dweller remains, were found other remains that are unquestionably of that period. Typical sandals and many other objects that could not be confused with later periods demonstrate the fact that portions at least of the Mesa Verde were occupied by the Post Basket-makers.

POST BASKET-MAKER REMAINS IN STEP HOUSE, MESA VERDE

"In one of the far western branches of Navajo Canon, [was a building] which we called the Step House, from the stairway or series of stone steps leading from the cave to the mesa above. Only a small portion of the northern end of the cave is occupied by buildings, leaving a considerable space open. In this open space Nordenskiöld made some good finds, but he did not go deep enough to get one of the most important items of information yet discovered. This cave does not seem to have been a favorite of abode for the Cliff Dweller. They do not appear to have lived in it very long, and only a small community at that. On the surface of the space not occupied by buildings, when we were first there, was from one to two inches of fine dust. Under this was the usual Cliff Dweller rubbish, several feet deep near the buildings, thinning out to only a few inches in other places. Under this stratum of rubbish we found from two to three feet (it was not evenly distributed) of dirt similar to the surface dirt, only quite solid and compact and entirely devoid of any sign of human presence. Under this were the remains of ancient buildings of wood, no stone having been used in their construction. They had been destroyed by fire, but enough charcoal and partially burned wood remained to give an idea of how they were built, much like the Navajo hogan of today. We found twenty-four pieces of mica pottery, the roughest and crudest we had ever seen, being unglazed and unpainted. Not much different

from what children sometimes make in play, except that the shape was regular. A few bowl shaped pieces had been molded in baskets, the imprint of the basket being unmistakable on the outside.”⁵

Again, in the Pagosa-Piedra region are many primitive structures containing material remains that indicate that these people also occupied this region. There is a logical sequence in housebuilding in the Pagosa-Piedra area that makes it difficult to differentiate between what is really Post Basket-maker and what is truly Pre-Pueblo. Where burials and pottery are found in a ruin one can tell by these remains to what period they belong.

The writer has placed the sequence in the following tentative order: “First. Pit-houses: these were houses which were semi-subterranean with the plastering applied to the native earth and with a double slant roof.

Second. Pit-houses with cobblestone walls. While these are not in a class by themselves they plainly indicate a step in the sequence of house building.

Third. Pit-houses with cobblestone walls and the paving of floors with slabs and cobblestones. The first use of horizontal slabs laid above the cobblestone walls. Here is probably where the first type of flat roof occurred.

Fourth. Single rooms all above ground, without any excavation, using a few cobbles for the foundation and horizontally laid slabs of stone above these for the remainder of the walls.

Fifth. Small groups of from three to six or eight rooms built in a similar manner to those of group four.

Sixth. The large pueblo or concentration of several houses of the type of group five.”⁶

While this sequence extends from the Post Basket-maker, through the Pre-Pueblo and up to the Cliff Dweller-Pueblo periods, it is clearly marked in the Pagosa-Piedra

⁵ C. C. Mason, “The Story of the Discovery and Early Exploration of the Cliff House at the Mesa Verde” (1918). This is a manuscript in the archives of the State Historical and Natural History Society of Colorado.

⁶ J. A. Jeançon, *Archaeological Research in Southwestern Colorado, 1921*, page 5.

region, and gives a basis for discussion of the several periods as they succeed each other.

As has been said earlier in this chapter, the radical differences between the Pre-Pueblo and the Post Basket-maker appear to consist of several things:

The first one is that the Pre-Pueblo is an intruder of different blood stock. From the skeletal remains of this people we judge that he was of taller stature and different skull shape. He also brought with him the bow and arrow, cotton, beans, and possibly other things of which no remains are to be found at this time. Whether he conquered and destroyed the Post Basket-maker or only assimilated him we also do not know. Suffice it to say that from the advent of the Pre-Pueblo great advances were made in housebuilding, ceramics and other phases of their culture. In every area containing remains of this period there appears a logical sequence of development. Whether this period was long or short we again do not know, but the surmise is that it did not extend over a very long period.

In this period we have the disappearance of the excavation of the house site, and the building above ground; the development of the kiva as a distinct feature; the advance in ceramics; the grouping together of several rooms which constitutes the first phase of the "huddling" found in the great pueblos of the Cliff Dweller-Pueblo period. There are probably two reasons for the "huddling" or concentrating of families: first, outside pressure by strangers outside of the tribe, or even unfriendly clans of their own people; second, the desire of related clans for a closer association for mutual protection and enjoyment. With this closer contact undoubtedly came the first organized efforts for communal life and local government. This was only a natural development.

In the late phases of this period we find many examples of the small pueblo with a distinct clan organization evidenced in the grouping of the rooms and companion kiva. This persisted into the Cliff Dweller-Pueblo period.

The Cliff Dweller-Pueblo period may well be called the "Golden Age" of the prehistoric people of the Southwest. The great caverns, in the cañons, the broad expanses of the

mesas and valleys offered locations for buildings that since have become the wonders of modern days.

In this period we see the growth from small groups of houses to that of great communal buildings housing many hundreds of people. Possibly the most interesting feature of all is the terraced pueblo in a natural cave, of which the Cliff Palace, Spruce Tree House, Spring House and Balcony House are amongst the foremost examples.

CAUSES FOR SETTLEMENT IN THE CAVES IN THE CLIFFS

There are several reasons for the selection of caves and openings in the cliffs as places of residence and storage. Pressure from outside tribes undoubtedly had some effect and must be considered, although this was probably only a secondary reason. Another cause which carries more weight was the inadequate protection afforded by the earth lodge and pithouse. Again, the large amount of shelter furnished by the caves, not alone for the individual man, but for his family and all the dependents and possessions must have been a potent factor in the matter. It is more than likely that some portions of the caves were used for storage purposes before they were occupied as residences and the advantages of living in them can not have been overlooked. One more reason must also be considered, that is, that a large cave would permit of the gathering together or huddling, if it may be so called, of larger groups of people which would afford them a greater sense of security and closer contact of clans related and associated together. There is no doubt that the last reason is also responsible for the compact grouping of the rooms in the later pueblos and even extending down to and for some time after the coming of the Spaniards. It is a natural sequence that living in caves, as they did, should result in housebuilding and the developing of architecture as expressed in the ruined remains of their homes.

There is no question but that the first uses to which caves and caverns were put was a secure place for the storage of corn, religious paraphernalia, burial of the dead, and a general use for storage that afforded a certain amount of secrecy.

Probably the first houses in the caves were only small shelters to wall up any of the objects which they desired to preserve; then followed one, two or three room groups to which additions were made as necessity arose through the enlargement of families. The attaching together of houses and of members of clans, and the final result of small villages that later grew to the great communal houses are all natural sequences. Mesa Verde abounds in representative types of the small enclosures which were used as storage places and granaries, as well as many small one and two room shelters that may have been used for ceremonial purposes or for lookouts. In Sand Creek, Rock Creek and all along the McElmo Cañon are found innumerable specimens of the farm house and storage types. These are situated in caves adjacent to agricultural areas and plainly indicate their uses. In Mancos Cañon, Dolores Cañon on the Mesa Verde and in many other parts of Southwestern Colorado are many such shelters and houses. Some of these are so cleverly concealed that their existence is not suspected until one is almost at them.

The growth from a few rooms to a compact group forming a small village and from that to the larger villages was a natural and normal one. With the exception of Sun Temple, on Mesa Verde, there is not a group of ruins of any type that seems to indicate a preconceived idea as to the ground plan as it now exists in ruins. It was plainly a growth by accretion—by the building of additional rooms as the necessity arose. It does not necessarily follow that all of the rooms of the village were occupied at the same time.

We have many cases where one part of the village was abandoned while another, probably the newer part, was still occupied. What the reasons were for abandoning these other rooms is unknown now. It may have been one phase of the general abandoning of the village. Possibly the clans who had inhabited these earlier rooms may have moved away or died out, and left those living in the newer parts to remain until they either died out or moved away.

Where the rear of the cave was not high enough to place living rooms they were often used for burial purposes and to confine large herds of wild turkeys. They

were also used as ash and rubbish heaps where the kitchen refuse was dumped. In this refuse one finds large numbers of potsherds, broken wooden and bone implements, sweepings and in fact all of the trash and debris that would naturally occur in such a village. On the top of the refuse are turkey droppings often to the depth of several feet. Under the refuse and often in it were deposited the bodies of the dead, mostly accompanied by mortuary objects and offerings.

In the large cañons of the Mesa Verde are located the best examples of the large community houses built in natural caves. These are best represented by Balcony House, Spruce Tree House, Spring House and Cliff Palace.

Balcony House is one of the most recent places of occupation, thus indicated by the masonry, which is excellent, and shows more care in the dressing of the stones, the laying up of the walls and in many other structural features. That the site was chosen with an idea of defense is demonstrated by an addition of protective features to those which occur in the natural formations. In the first place, the cave is situated many hundreds of feet above the bottom of the cañon; it was not accessible from the front without ladders, which they probably had, as Baron Nordenskiöld found the remains of one of these made of a cedar pole and an oak prop bound together with yucca fibre at the foot of the cliff, below the house.

At the south end of the ruin additional precautions had been taken; the entrance from this point was guarded by a narrow tunnel which only permitted access to the ruin by crawling on the hands and knees through it. The outer side of the tunnel was pierced with loop holes that commanded a trail which led to the entrance from that side. A narrow ledge, with a terrible precipice on one side and the cliff wall on the other, ran south from the southern entrance to the tunnel. At a place where one could get up from below or come down from above, this ledge was again guarded by a strong tower, the remains of which are still in evidence.

A retaining wall had been built all along the front of the opening of the cave proper. This was to answer a two-fold purpose, that of additional protection from a foe seek-

(Courtesy of the Denver & Rio Grande Western Railroad)

CLIMBING TO BALCONY HOUSE
Mesa Verde National Park, Southwestern Colorado.



ing entrance to the village and also as a protection from falling over the cliff. This wall was built right on the edge of the precipice and incloses two courts. The southern one was occupied by two kivas, back of which were living rooms. A wall from one of these rooms projects to the front of the cave enough to divide the space into the two courts. The north court is occupied by a building having a balcony in front of it. This balcony gives the name to the ruin; and is in a remarkable state of preservation. It is formed by the projecting beams of the floor of the second story, these being covered, transversely, with long poles, which are in turn covered with layers of cedar bast and over all a heavy coat of adobe. The manner of construction used in the balcony was the same as was used to make floors and roofs, all over the pre-historic Southwest.

Spruce Tree House is another one of the more recent dwellings of the Mesa Verde; this is again evidenced by the excellent masonry and other features. Most of the houses in the cave were two stories high and there may have been some in the front part of the cave that were one story higher.

Many of the walls of this building still have the remains of plastering on them. This is especially true of the interior ones. Occasionally a dado of different color was applied to the walls in an effort at decoration. There are also several pictographs.

The kivas of Spruce Tree House are all in front of the main group of buildings. When these were roofed over it afforded the inhabitants a roomy plaza upon which to perform dances and hold assemblies. Amongst the Hopi of today the roof of the kiva is tabooed ground during the progress of a ceremony being held in the interior, but at other times there does not appear to be any rule against using the roof as a passage way or place of relaxation.

Speaking of the spruce tree from which the group takes its name, Baron Nordenskiöld says: "I had it cut down in order to ascertain its age. We counted the rings which were very distinct, twice over, the results being respectively 167 and 179." How long it was after the village was deserted that the seed dropped into the kiva where the tree

sprang from it and attained its growth, is a question that cannot be answered.

Probably the best known ruin in Southwestern Colorado is the Cliff Palace, in the Mesa Verde National Park. The size and beauty of it have made it justly famous. Here we have one of the best examples of a pueblo built in a cave. The terraces rise in four levels, the lowest of which is the cave floor. The cave opening is roughly 300 feet in length and contains about 100 secular and 23 ceremonial rooms. Doctor Fewkes estimates that originally the group contained about 200 rooms. There are several places where the buildings must have attained the height of three or four stories.

In many places the walls still reach to the roof of the cave and when the building stood intact it is more than probable that this occurred in other places as well. The necessity for building superposed rooms was probably caused by having utilized all of the available space on the floor of the cave, and as the need for more rooms arose the only place to put them was on the top of the others. It is true that in the plaza quarter there was space for more ground floor rooms, but it was necessary to have streets and passages as well as open places for the performance of their dances and ceremonials that were held in public.

The growth of Cliff Palace from detached groups to its present compact form is plainly shown. Doctor Fewkes gives the following divisions:

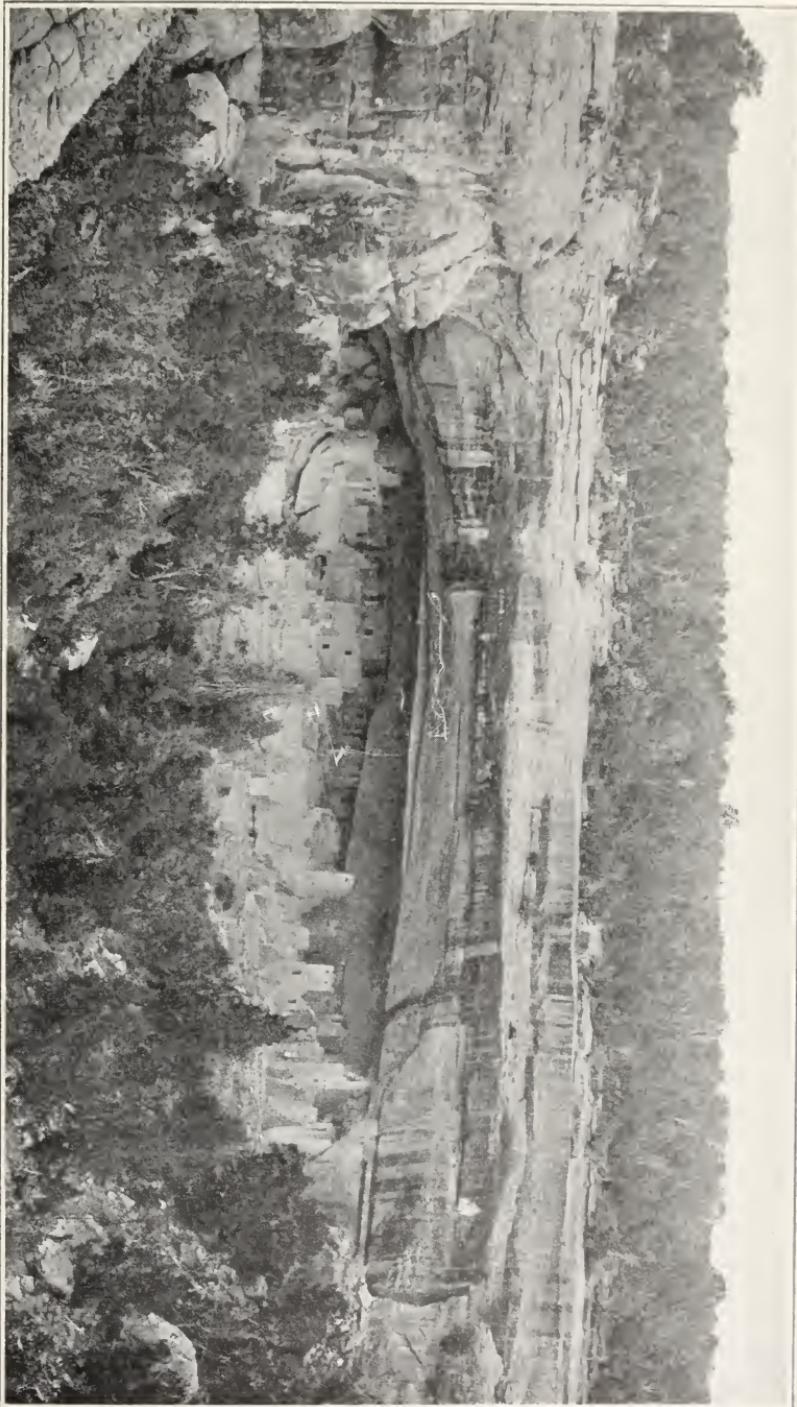
For convenience of description Cliff Palace is arbitrarily divided into four quarters, known as the tower quarter, plaza quarter, old quarter and northern quarter.

The plaza quarter, as its name indicates, is a large open space, the floor of which was formed mainly by the contiguous roofs of the several kivas that are sunk below it. The main entrance to the village opens into this plaza at its northwestern corner, and its northern side is continued into a court which connects with the main street or alley of the cliff village. From its position, relations, and other considerations it is supposed that this quarter was an important section of Cliff Palace and that here were held some of the large open air gatherings of the inhabitants of the place; here also no doubt were celebrated the sacred dances which we have every reason to believe were at times per-

(Courtesy of the Denver & Rio Grande Western Railroad)

CLIFF PALACE, MESA VERDE NATIONAL PARK

This is the largest of the numerous prehistoric ruins in the Park, being 300 feet long and having contained approximately 200 rooms, including 23 kivas, or underground ceremonial chambers



formed by the former inhabitants. . . . Judging from the number of fireplaces in this quarter there is reason to believe that much cooking was done in this open space, in addition to its use for ceremonial and other gatherings of the inhabitants.

The section of Cliff Palace that has been designated the old quarter lies between a line drawn from the main entrance of the ruin to the rear of the cave and the extreme northern end, culminating in the high castle-like cluster of rooms. It may well be called one of the most important sections of Cliff Palace, containing, as it does, the largest number of rooms, the most varied architecture, and the best masonry. Its protected situations under the roof of the cave is such that we may consider it and the adjoining plaza quarter of the earliest settled sections of the village. It contains all varieties of enclosures known in cliff dwellings; kivas of two types, round rooms, rectangular rooms, an alley or street, and a court. The floor of the cave on which the rooms are built is the broadest at this point, which is one of the best protected sites and the least accessible to enemies in the whole building. The old quarter is divided into two parts, a northern and a southern, the former being arbitrarily designated the Speaker-chief's House. The "street" running approximately north and south bisects the old quarter, making a front and rear section.⁷

As in the case of Spruce Tree House there are open spaces in the rear of the buildings that served as repositories for all kinds of trash and debris. In these trash heaps are often found the finest burials and relics of pottery and other minor antiquities.

Cliff Palace has three features that are unique. These are the two towers, one round and the other square, and the Speaker-Chief's House. The towers are located in the "tower quarter" and have caused much speculation. What the function of the round tower was is not clear and yet it is conceivable that, from its commanding position and symmetry it was only for secular use; but in the case of the square tower everything seems to indicate that it, at least, was associated with the kivas in its neighborhood, and may even have been used for purely ceremonial purposes.

The building known as the Speaker-Chief's House is in the old quarter of the village and from its prominent posi-

⁷ J. Walter Fewkes, *Antiquities of Mesa Verde National Park. Cliff Palace* (Bulletin 51, Bureau of American Ethnology), 27-28.

tion, overlooking the whole village, there has been assigned to it the use as a point from which the Speaker-Chief made his announcements. It is built of well laid masonry and compares very favorably with anything that white masons could build.

We find, in this period, that a definite use has been assigned to rooms of certain forms. The secular rooms are universally rectangular or square, while the circular ones were reserved for ceremonial purposes. The secular rooms vary in size according to their uses, those for storage purposes being smaller than the ones set aside for dwellings. In considering the uses of the rooms we must bear in mind that the prehistoric peoples had no home life such as we have. They were a community and as such had practically everything in the way of relaxation and amusement in common. Furniture in the modern sense of the word, musical instruments—excepting drums and very primitive flutes—books, and all of the other things possessed by us which go to make up our home life, were unknown to them. There is no question but that most of their lives were spent in the open parts of the caves and the rooms were only used to retire into in times of inclement weather and for depositing such property as belonged to the individual. As has been shown in the description of the plaza quarter of the Cliff Palace, most, if not all, of the cooking was done in the streets and open courts, and these were also used as a place for gathering for all social and public ceremonial purposes. Most of the grinding bins were in the open and here the women would gather to grind the meal, while one or more of the men sang the grinding songs or retailed the latest scandal and gossip.

There was more or less subdividing of the whole community into family or clan groups in the open places, but visits from one group to another often took place. The men mended their weapons and hunting apparatus, made new heads for their arrows and spears, practiced their songs, told stories and performed secret rites in the kivas, while the women made pottery and performed most of their tasks in the open. The children played all over the place, and yet there was no family life as we know it.

When it became necessary to retire to the rooms on

account of the weather, it is more than probable that the men went into the kiva, which was a club house for men and boys, as well as a place for the celebration of secret rites, dressing room for public dances and ceremonies, and the women and young children went into the larger rooms and made themselves as comfortable as possible under the circumstances.

The limited use of the rooms did not therefore require them to be very large; and their size has given rise to a wrong impression that the people were of short stature. That this is not correct is shown by the measurements of the skeletal remains.

In some cases we find that there were two or even three tiers of rooms one above the other, and also that these rooms were sometimes connected by hatchways in the floors permitting passage up and down in the interior. Pegs set in the walls or handholds acted as stairs by which to pass from one floor to the other. The inside walls were nicely plastered, often having colors applied to them, the colors being red, white, yellow, brown and blue. The lower half of the room was usually of a different color from that of the upper half. At times a dado or ornamental band of another color was added. This might occur in different places, sometimes near the floor and again about halfway up the wall or even higher. In many cases where adobe had been applied to the cracks in the walls and around the floor and roof beams we find impressions of corn and corn cobs. This marking is universal all over the area, and while the reason for it is not understood it was probably done with ceremonial intent, possibly to bring the strength and nourishment of the corn into the house.

Doorways and windows seldom occur in the same room, although we do find them sometimes. The doors were rectangular openings, usually just large enough for a person to crawl through. The T-shaped opening used for a door is interesting and the Hopi account for it by saying that there are two reasons why it was built in that form. The first reason goes back to the time when the buildings had only a stone slab or blankets and hides with which to close all openings into the rooms. During the winter months the lower part of the opening was sealed up with stone and

adobe, leaving only the broad top for an entrance. The second reason applies even to this day and was that the broad opening at the top facilitated the entering of the room with a burden on the back of the one coming in. Windows in the cliff and pueblo houses were only small square or round openings and probably performed a two-fold purpose of lookout and ventilator. The construction of roofs and floors was the same; in other words, the roof of one room would be the floor of the room above and where a room or house was only one story high there was no change in the construction of the covering from what it would have been if it were a floor. Where the overhanging cliff permitted, as occurred in many cases, the cliff itself formed the roof.

ARCHITECTURE

According to Doctor Fewkes the name kiva is derived from the two Hopi words, "ki" meaning house and "va" meaning old or ancient. The principal function ascribed to a kiva is a religious one. A secondary use is as a club house, weaving room and general assembly place for men and boys. As is still the case, women were probably not admitted excepting upon special occasions when they had a part in a ceremony or were spectators in some public presentations of religious dramas.

From explanations given by the Pueblos, the kiva is no doubt a survival of the time when they dwelt in circular pits, subterranean or semi-subterranean. By some it is said to be a reminder of the place where they emerged from the underworld into this one. The genesis myths of many of the southwestern Indians tell of their being created three or four stories under ground and finally emerging into this world or plane after a long series of adventures.

The only entrance to the prehistoric kiva was a hatchway in the roof and appears to have been a ceremonial requirement. One feature, that of building the kiva into the main group of buildings, is remarkable. This is distinctly a prehistoric feature of the ruins of Southwestern Colorado. In other sections of the Southwest we find that this rule has not been adhered to and in the later pre-

historic ruins of Utah, New Mexico and Arizona we often find the kiva detached from the main group of buildings, and we also find that the distinctly clan kiva has been more or less abandoned for a larger building of the same circular type which was probably used as a fraternity house. In other words, several related or associated clans used the kiva together.

The typical form of the kiva was a semi-subterranean, circular building. Occasionally we find an oval kiva but the general form is circular. Probably the earliest types contained six pedestals, the cribbing of which formed the roof. These pedestals or pilasters rested upon a bench or banquette which extends to the floor. From portions of the original roofs found in the Square Tower House, at Aztec, New Mexico, and at Pueblo Bonito, Chaco Canon, New Mexico, we have been able to reconstruct the whole. The logs used in its construction were first laid horizontally on the six pilasters, and the rest raised one above the other in the form of cribbing gradually constricting the octagon formed by the logs until a rectangular opening was left as a hatchway or entrance. When the desired height was attained other logs were laid over the cribbing, horizontally, and the whole covered with cedar bark and adobe. The form produced by the cribbed construction almost attained the dignity of a vaulted roof and if they had continued to improve upon it, might have resulted in a dome. The hatchway or entrance was always above the fireplace. Another feature of the older kivas is the opening in the floor which is usually a short distance from the fireplace and is called the "Sipapu" or ceremonial entrance to the "Underworld." In many modern kivas this opening still persists and when the dancers pass over it they stamp upon a board which has been placed above it to let the people (the dead) who are living in the underworld know that a ceremony or dance is being held in this world.

The kivas in the cliff houses are usually smaller than those of the ruins on the mesas and down in the valleys. An average size for those in the cliffs is from twelve to sixteen feet in diameter, while those in the pueblo ruins run as high as thirty-five to forty feet in diameter. The larger kivas and larger secular rooms in the pueblo ruins

have led some of the scientists to attribute to them a later period than the cliff house.

In connection with the kivas some remarkable excavating has been done by the builders; there are a number of cases where the floor of the cave was too high in relation to the other rooms to place the kiva partly underground, so they excavated in the rocky floor and obtained the desired depth in that way. That this was a task of some magnitude we may well understand when we remember that they had only stone tools with which to do the excavating.

In front of Cedar Tree Tower, in the Mesa Verde, the builders excavated a kiva in the caprock which measures thirteen feet in diameter and is almost ten feet in depth. While it is true that the caprock is a laminated soft sand stone still it must have taken a great amount of labor to dig out such a cavity. After the excavation was finished it was lined with an excellent wall laid up of small slabs not over an inch or two in thickness and in very short lengths. The stone floor of the kiva was covered with a wash or plaster of adobe to smooth off the irregularities. There are evidences that the walls were also plastered.

In the walls of kivas are often found small rectangular openings which were used as repositories for small objects such as meal bowls, fetishes and other small ceremonial objects.

An important feature of the kiva is the deflector; this is usually a wall erected in front of a passage leading from the outside through which cold air was conducted into the room. This ventilating shaft is not large enough for the passage of a human body and while there have been various explanations of its use, none of these have been as satisfactory as that of its use as an airshaft.

Extensive experiments by Doctor Fewkes and others have demonstrated that the shaft was a ventilator and that the wall in front was a deflector and not an altar.

There is some question as to whether the pueblos built out in the open were not occupied at the same time as the cliff villages. Possibly some of them were, but from the increased size in the rooms and kivas it would seem that at least the larger groups were of a later date. This does not necessarily indicate any lengthy period between the two



CHIMNEY ROCK

types but rather a gradual going from one to the other. The pottery, skeletons and minor antiquities are the same in both cases. One thing in favor of the idea that the open air pueblos are of a later date is that the builders of the late cliff villages adopted a system of double walls with a core of rubble and adobe between them and this system prevails in all of the large open air pueblos.

There are many buildings in the class under consideration scattered all over Southwestern Colorado. In the Pagosa-Piedra region on the Chimney Rock mesa we have such a building with a masonry construction that relates it to the Chaco culture about 150 miles south of the Colorado border, in New Mexico. The large pueblo on top of Chimney Rock mesa is built of small sand stone slabs laid in regular courses of bands; between these bands are inserted much smaller pieces of the same material making the effect of a mosaic or inlay. The building was very large and probably contained thirty-five rooms on the ground floor and originally stood three stories high, probably in terraced form.

Notable examples of other pueblo ruins are to be found at Yucca House, Blanchard Ranch, Mitchell Springs and all along the borders of Utah and Colorado.

Perhaps the most unique open air ruin that has been excavated so far in Colorado is the Sun Temple on Mesa Verde. This is a huge D-shaped building that was never finished. This was determined by the fact that there was not enough loose building material lying at the foot of the walls to indicate that they were much higher when the place was abandoned. Again it is unique in that the whole scheme of the building was planned before its construction began. Its ceremonial character is established by the ground plan which shows that the rooms were not built to be occupied as dwellings, the two kivas in the open court and the Sun Shrine at the southwest corner of the building.

In Sun Temple we have an excellent example of outside and inside wall with a core of adobe between. The exposed faces of the exterior and interior walls are well dressed but not tied into the core, which was a defect in construction.

There are three kivas in the group. Two of these are in the open court surrounded by the D-shaped walls and the

other is in the compact mass of rooms at the southern end. The absence of fireplaces, sipapus and deflectors in all three of the kivas is noticeable. In all three there are the beginnings of a ventilator shaft and possibly the other typical features were to have been added at a later time.

There are a number of exterior stones in the walls that have curious incised designs upon them. One often finds paintings, of a similar character, upon the walls of plastered rooms, but designs sculptured on component stones are rare. As a rule they are geometric, not unlike those on the painted pottery from the ruins.

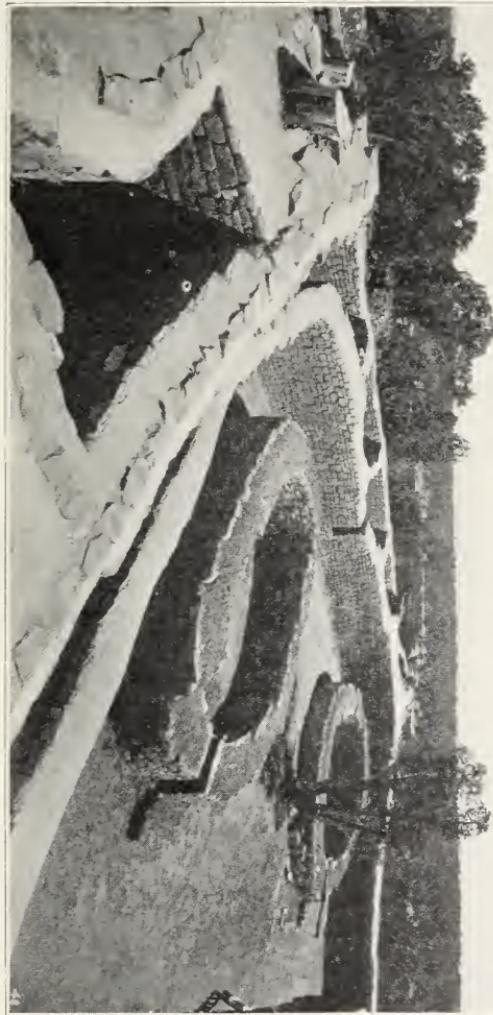
It would hardly be fair to describe Sun Temple without giving a few words to the shrine from which it takes its name. It is located on a solid rock that projects about one and a half feet above the otherwise level foundation of the wall at the southwestern corner of the building. It consists of a large mass of sandstone roughly cut into rectangular shape and bearing upon its uppermost surface a fossil palm leaf with a depressed zone in the center and sharply radiating ridges. There is a possibility that the builders may have emphasized the sharpness of the radiating lines.

Doctor Fewkes makes the following comment upon the shrine:

A natural object with these characters would greatly affect a primitive mind, and no doubt was regarded with more or less reverence by the builders of the Annex. At all events they have partially inclosed this emblem with the walls in such a way as to inclose the figure on three sides, leaving the inclosure open on the fourth or west side. There can be no doubt that the walled inclosure was a shrine, and the figure on it may be a key to the purpose of the building. The shape of the figure on the rock suggests a symbol of the sun, and, if this suggestion be correct, there can hardly be a doubt that solar rites were performed about it long before the Sun Temple was built. Practically, a person sitting in this shrine on September 21 observes the sun sink below the horizon directly in front of him.⁸

There are innumerable small ruins consisting of from one to five or more rooms that appear to have belonged to

⁸ J. Walter Fewkes, *Sun Temple, Mesa Verde National Park* (Department of the Interior, 1916), 20-21.



(Courtesy of Denver and Rio Grande Western Railroad)

SUN TEMPLE, MESA VERDE NATIONAL PARK

the same period as that of the large open air pueblos. These are principally in the cañons and overlooking agricultural areas and there is no question but that some of them were used as summer homes that were occupied during the summer months when the people followed agriculture; and others were only for storage purposes, as in many of them are still found the remains of corn, beans, squash and other seeds. Usually they are found close to the fields in which are the remains of extensive irrigating systems.

Running along the north side of the McElmo Cañon is a strip of country that is very rough and rugged, and in this section are found some of the most unique examples of the tower culture. This cannot be classified as a separate culture, but must be considered as a peculiar phase of the architecture of the Cliff Dweller-Pueblo period. There are square, round, oblong, oval and irregularly shaped towers in this section. Some of them are attached to large or small pueblos while others stand alone, and in one case there are two together. Ruin Cañon, Colorado, is the most remarkable example of this phase of architecture and presents almost every variety of tower. The most beautiful example is that of the twin towers that stand on the south side of this cañon. The form is that of two ovals joined at the ends and with the outside ends slightly flattened. The masonry is very good and they still are about thirty feet in height.

A little below them is another interesting group; this is composed of four rooms built under an overhanging shelf of a large boulder. The opening in which they are placed formerly contained a large part of the boulder, but this had weathered out leaving an overhanging shelf upon which the house has been built.

In the second terrace of Ruin Cañon is a large square tower over thirty feet high and which was originally attached to a group of ruins a part of which still exists in the side wall of the cañon.

There are many towers of different kinds, some attached and others unattached, on the Mesa Verde and other parts of the region.

AGRICULTURE

That the prehistoric people of Southwestern Colorado understood irrigation is shown by the remains of irrigating ditches that are found in agricultural areas. While there are a number of examples of these ditches on the Mesa Verde, the Tower region north of McElmo Canon is particularly rich in these remains. Along the sides of Sand Creek, which runs into McElmo Canon from the north, are many fields that are crisscrossed with ditches. An examination of these shows that the builders were, in some way, able to establish grades that would carry water in any direction they chose and these grades could hardly be improved upon by modern engineers.

On Mesa Verde are series of dams in the cañon beds and mesa slopes that preserved large bodies of water at flood times for future use. Besides this there are many natural tanks worn in the rocks that were utilized for a similar purpose.

That the prehistoric people were farmers of no mean ability is shown in the great quantities of corn, beans and other vegetables found in the ruins. Almost every one contains more or less corn, sometimes charred and again in good condition. In one granary in Sand Creek, in 1908, the writer found a tremendous quantity of corn cobs and underneath these were several hundred pounds of corn on the cob. In this particular instance the corn was of a small variety similar to pop-corn. However, many different kinds of corn have been found, some of it as large as the modern Indian corn. Most of the prehistoric corn is variegated the same as the modern Indian product.

Beans of the type called "Mexican frijoles" have been found in large quantities. All stories to the contrary, the writer has never heard of an instance where genuine butter beans have been found. Squash, pumpkin, gourd and calabash seeds as well as the rinds and stems of these have been frequently found. Wild berries, seeds and fruits were also used. The ripe fruit of the yucca, a large purple ovoid, is as delicious as any apple.

The flesh of animals added a part to their diet. How large that part was we have no way of telling. There are many evidences that wild turkeys were captured and con-

fined in the inner recesses of the caves. The Hopi Indians contend that the turkeys were not used for food but were only kept for their feathers; in fact, the Hopi of today do not eat the turkeys kept in modern villages, but pluck their feathers for ceremonial purposes. The Rio Grande Pueblos all eat the turkey, and say that their ancestors who lived in the cliffs did the same.

ARTIFACTS

Scattered over the whole of Southwestern Colorado, on and around the ruin sites of the prehistoric people, are tons and tons of potsherds. At the abandonment of the buildings great quantities of the pottery were left and their remains were everywhere in evidence. Many complete pieces have been found in the course of excavations and in washes along the banks of draws and arroyos. Materials used, forms, decorations and colors vary so much that one is amazed at the many differences. In those days earthen wares took the place of our modern cooking and table wares. Upon abandoning a building the things possessing the greatest weight had to be left behind as there were no beasts of burden and everything had to be transported on the backs of the people; therefore, only the most necessary things were taken and the balance left.

There are, in the vicinity of practically every ruin, one or more clay beds which would furnish material for making pottery. The clays found in the different localities differ only in a small way. In certain sections, tiny quartz crystals or ground and pulverized potsherds were used for temper. It is claimed by some scientists that pottery was derived from basketry, the latter antedating the former. In studying the construction of the pottery this is shown by the rolling of the clay coils, which were placed one above the other and pinched together in a similar manner to the sewing of the reeds composing a basket, the pinches taking the place of the stitches. No mechanical appliance, such as the potter's wheel, was used. The whole process was one of skill with the hands and trueness of the eye. There were used, in certain cases, supports such as hollow earthen vessels, baskets and gourds, but these were only

for the purpose of supporting the base of the vessel in process of construction. Basket impressions are often found on the bottom of early pottery.

With reference to the forms of pottery the following is of interest: "In form the ancient ware was universally simple and pleasing. High necked bottles and shallow plates are of rare occurrence. There is a notable dearth of life forms. There can be no doubt that ceramic forms are to a great extent derivative. Turning to nature for possible originals, we find them supplied by both animal and vegetable kingdom. The gourd for example was utilized at a very early date. One of the ordinary forms cut off midway would suggest bowls; by cutting the body of the gourd longitudinally, at one side of the apex, we have dippers with straight or curved necks or handles. The primitive potter would, in like manner, have the suggestion of a handled vessel in clay. The ancient Pueblo potter rolled out a long fillet or rope of clay, varying in width and thickness to suit the size and character of the vessel to be constructed. When it was properly smoothed and trimmed, the potter began by taking the end of a single strip between his fingers, and proceeded to coil it upon itself, gradually forming a disk. At first the fillets overlapped only a little, but as the disk grew larger and was rounded upwards to form the body of the vessel, the imbrication became more pronounced. The fillet was placed obliquely, and was exposed to the exterior side to probably one-half of its width. Strip after strip of clay was added, the ends being carefully joined so that the continuity might not be broken, until the vessel was completed. The rim generally consisted of a broad strip, thickened a little at the lip and somewhat curved. So thoroughly were the fillets pressed down and welded together, that the vessels seldom fracture more readily along the lines of junction than in other directions. In pressing the coil down and welding it to the preceding turn, internal support would be necessary, as otherwise the strain would warp the wall. A curved trowel or rounded pebble could be used as long as the aperture would admit the hand."⁹

⁹ W. H. Holmes, *Pottery of the Ancient Pueblos* (14th Annual Report, Bureau of American Ethnology).

There is one form common in Southwestern Colorado that is of unusual interest, namely: the so-called "beer mug." The origin of this is found in the pit house where the form is similar to a modern flower-pot. In the beer mug, a handle has been added to the earlier form. It is difficult to find what suggested this form in the beginning. Another curious form is the so-called boot or duck shape; what the function of this type was is problematic. It has been suggested that it was used as a lamp. The forms that are commonest are the bowls, mugs, pitchers, heart-shapes, dippers and large containers. There are many variations of these and it is impossible to give a detailed description of them here. In addition to the above-named well-known forms there are eccentric forms such as the double bowls, a few animal forms, and many of indeterminate shapes.

As the manufacture of wares progressed, the desire for artistic expression caused the potter to smooth over the outside surface, the inside having always been smoothed, and apply a wash or slip of a lighter color. This wash was white at first and in later periods we find reds produced by painting the vessel with oxide of iron or yellow ochre, which burns a beautiful red. Yellow ochre was also introduced into the paste and often the red color runs through the entire vessel.

Before the slip was applied and after the vessel was sun-dried, it was subjected to a thorough polishing by rubbing it with a suitable implement. This was usually a small stone with fine grained surface that would not scratch. Early investigators who had not given enough study to the matter, took this polish to be a glaze, but such is not the case.

The first attempts at decorations were confined to smears of black on the white surface of the wash. (This statement only applies to the black and white ware. There were many attempts at decorations without colors, in the fanciful arrangements of the coils and incisions of the plain black ware. There were also appliqued coils and other decorations on the same ware.) After the smears came lines running horizontally around the inner periphery

of the bowls. This is shown plainly in some of the earliest ware found in the pit houses. The crossing of the horizontal lines with oblique and perpendicular lines, followed as a natural sequence, and from this was evolved an elaborate system of rectangular geometric design elements which were repeated as often as the surface permitted. The introduction of curved lines in the design elements seems to have been one of the last steps in the evolution of decoration of the pottery.

As in the pottery forms, so, in the designs painted on them, life forms are not common. Birds, conventionalized as well as life forms, are fairly often encountered. Dragon flies, snakes, and animals also occur in the decorations. In the geometric designs we find an immense variation. Figures composed of dots, straight lines, zigzags angular and curvilinear, checkers, chevrons and many other design elements too numerous to mention occur in seemingly never ending variety.

The higher type of pottery was the black and white ware. In the white ware the paste on the inside is of a greyish tone and the white slip over it is occasionally of a beautiful dazzling white. The predominate color of the white outside slip is, however, more of a dirty white or grey. Possibly when the vessel was first made the white was clearer and of better color, but it is rather rare to find a piece with the clear white slip.

The cooking ware is almost always coiled, undecorated ware, burned black by use and of the greatest variation in form. The paste is mostly of a greyish black and burned very hard.

Cotton was used as a raw material for the finer textiles. While it has not been definitely established that the prehistoric people of Southwestern Colorado raised cotton themselves, yet their near neighbors in Utah did so and the Colorado people, if they did not raise it themselves, obtained it by barter. A goodly number of specimens of cotton cloth have been found in Colorado, although no cotton seed, to the writer's knowledge, has been found. Some of these specimens of cloth are plain and others have elab-

orate designs woven into them. They consist of bits of blanket, head and breast bands for carrying burdens on the shoulders, and many other things.

Grasses, cedar bark and bast, yucca and other fibres were utilized for making many textiles. The yucca afforded them an excellent material for ropes and sandals. In the fall, when the leaves of the yucca had begun to dry, they were gathered and soaked in water until all of the glue was removed, then the fibres were pounded with rocks until they became separated; after this they were dried and then the fibres were carefully separated and twisted into hanks that were ready for the making of the cords, or anything else that was desired.

The unbeaten leaves were used for making sandals, mats and baskets. Willow was also used in the manufacture of baskets and mats. Cedar bark offered the material for making rings which were used as pot rests and also for supporting vessels carried on the head. Yucca and grasses likewise were used in the manufacture of these rings.

Perhaps the most remarkable weaving, if it can be so called, is the feather cloth. A basic net of yucca cord was first woven, then this was wrapped with a split feather, the split quill being applied directly to the yucca cord. Probably the quill was first soaked so as to make it pliable and then, after it had dried on the cord, it retained its form around the cord. The downy part of the feather projected outward and formed a soft mass similar, in appearance, to fur. A mortuary use has been ascribed to this type of robe, but it is more than probable that cloaks or blankets of this kind were also used as body coverings. The fur of rabbits was also used to make a similar robe. Amongst the Hopi of today the fur robe is still seen at rare intervals.

The skins of deer and other large animals were dressed and made into clothing, belts, moccasins and many other useful articles.

The baskets found in the ruins of the prehistoric people are of remarkable beauty and workmanship. The three-rod and interlocking stitch are fairly common as is also the twilled work similar to that made by the Zuni of today. Forms found in basketry include the flower-pot, flat and

shallow placques, winnowing trays, large and small bowl shapes, and some very handsome small bowl-shaped baskets with a plaited band around the top of the outside; this plaiting is similar to the herringbone of the Pai-Ute finish on the rim of the Navajo ceremonial basket. The weaving of the mats is remarkably fine, equaling in workmanship and fineness any of the best Chinese or Japanese mattings that are woven today. Usually they are edged with the herringbone weave and are durable and serviceable as well as being beautiful.

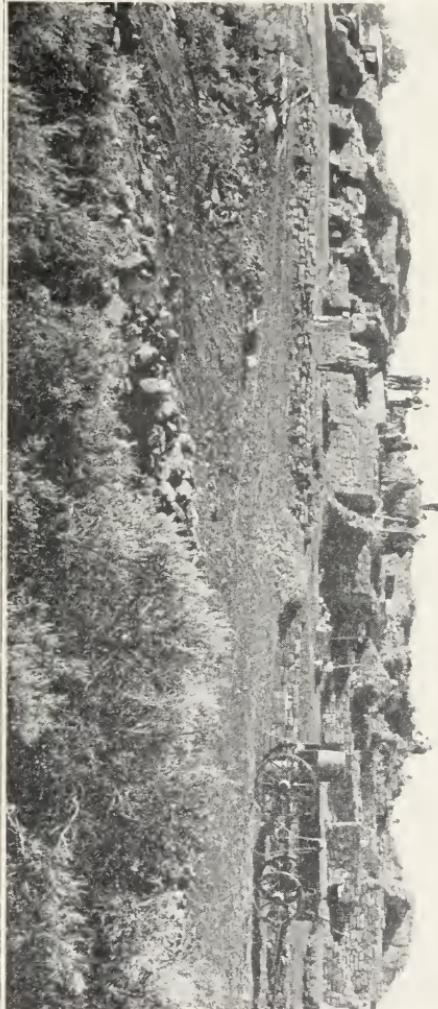
As the prehistoric people of Colorado had no metals of any kind it was necessary for them to find substitutes for these. It is not necessary to go into extensive description of the articles found as they are of too common a type to require this. Amongst the stone articles are found wood axes, usually very crude; mauls; hammers used in the dressing of the stones for the buildings; axes of many different kinds; and spear, arrow and javelin heads, some beautifully chipped and others very crude. Knives range from cutting edges formed by splitting off spawls made from the parent nodule to finely chipped blades that were fastened to handles of wood or bone, and held in place by pitch and wrappings of cord. Grinding stones, both large and small; stone mortars, pounding stones, smoothing, and polishing stones, and many others are included in the list. Many small stones were for ceremonial purposes, fetishes, and medicine stones. Bits of polished hematite were used for making pigments for painting their faces and bodies. Small cylindrical stones were used as medicine stones and also for games.

Awls, needles, pins, dirks and many other things were made of bones of mammals and birds. Tanning tools, fleshers and scrapers of many kinds and forms were made from the larger mammal bones.

Wooden articles include needles, fire sticks, ceremonial sticks and staffs, planting sticks called dibbles, wooden hoops for playing games, spindles and weaving implements, slabs, perforated sticks, hollow cylinders for holding prayer plumes, and many others. Cradle boards of wood, a sort of hammock of wooden slabs, and splints carved out of cottonwood are unusual finds.

(Courtesy of the Denver & Rio Grande Western Railroad)

FAR VIEW HOUSE, MESA VERDE NATIONAL PARK



BURIALS

Burials occurred in many ways. Nordenskiöld describes an oval pit, plastered on the bottom, the body lying on its side with the knees drawn up under the chin and surrounded by pottery. Over this was a mat, then sticks, another mat over them and finally earth over all. In another place, on the top of the mesa, the skeleton was not flexed but extended at full length. The flexed position seems to have been a favorite position in which to place the dead. Bodies have been found in the large cavities in the rear of the caves. These places in the rear of the caves were used extensively to confine large numbers of turkeys and also as a general dumping ground for all of the refuse of the village. It is under this mass of debris that many of the dead were buried. These bodies are usually flexed and wrapped in a mat or burial cloth of the yucca and feathers. Occasionally bodies are found walled in the rooms and accompanied by ceremonial offerings. In many cases dismembered skeletons are found scattered in the various rooms and this has given rise to the idea of a massacre having occurred in the place; but there are two ways of accounting for the dismembering of the skeletons, namely, rats, and also the fact that early explorers of the ruins in many cases scattered the remains of the dead in this way.

In the pueblo ruins, excepting where the bodies were walled in the subordinate caves and cliff dwellings, they were usually buried in great mounds, a large number together. Sometimes pottery accompanied these. There is nothing to indicate that the bodies were ever prepared with chemicals or other means of preservation.

That cremation was practiced is evidenced by the finding of calcined bones in cremation pits. Many such pits have been found and especially on and around the Mesa Verde. While excavating the Cliff Palace, Doctor Fewkes found a cremation pit in the north end of the ruin and in 1920 the writer excavated a cremation pit in Fewkes Cañon, just across from the New Fire Temple. The finding of the calcined bones is not an unusual thing and there are many evidences to show that the burning was not of an accidental nature, but that cremation was practiced often. Calcined

bones are rarely found outside of the cremation pits and if found outside they were probably carried out by rats which abound in the ruins.

ANTIQUITY OF THE RUINS

The question of the age of the ruins is usually of greatest interest to the non-scientific person.

While there are no exact means by which the age of the ruins can be established, yet an approximate period can be assigned by means of tradition, chronological periods in architecture, ceramics and minor antiquities.

Dr. A. V. Kidder assigns to the beginning of the Basket-maker period as remote a date as 1500 to 2000 B. C.¹⁰ Taking this as a basis upon which to work out a theory, it would seem safe and sane to say that the "Golden Age" of the Cliff Dweller-Pueblo period began some time near the beginning of the Christian era. There are many reasons to believe that this period extended over a long extent of time and that the final stages of the exodus from Southwestern Colorado terminated some six or seven hundred years ago.

Definite and absolute dates cannot be assigned to the various periods, but taking Doctor Kidder's theory, as a basis, it appears that we may say that the Basket-maker culture originated approximately 4,000 years ago, and the whole development, dissemination and dissolution of the original culture and its successors occurred within the limits of a 3,500 year period.

ARCHAEOLOGISTS AND EXPLORATIONS IN COLORADO

The first written report that we have upon the ruins of Southwestern Colorado is in the diary of Fray Escalante written in 1776. In this he speaks in several places of ruins along the Piedra River, on the Florida mesa and those on the Dolores River. There is no attempt at description of the buildings.

From 1776 to 1850 there does not appear to have been any reports made on ruins in Colorado. New Mexico and Arizona ruins are spoken of and often described at great

¹⁰ A. V. Kidder, *Southwestern Archaeology*, 119.

length, but Colorado is ignored. In Lieut. J. W. Gunnison's book on the Mormons (1852) he speaks of Major Bridger's telling him of having visited ruins which are represented as "gigantic ruins of masonry" west of the Del Norte and north of the Gila. In a recent history of Major Bridger these ruins have been identified as those of the Mancos Cañon and the adjacent country, but he could not have seen the Mesa Verde ruins proper, and had anyone seen them earlier than the Wetherills undoubtedly something more than passing mention would have been made of the fact, and there is no mention made until the reports of the latter.

In 1859 the exploration party under Capt. J. N. McComb crossed the southwestern corner of Colorado and Dr. J. S. Newberry, a geologist attached to the party, makes mention of many ruins along the route. It was he who gave the name to the plateau now known as the Mesa Verde. As seen by him from the banks of the Mancos River it was indeed a "Green Tableland." The McComb party did not penetrate the fastness of the Mancos Cañon or do more than skirt the foot of the Mesa Verde. Farther west, probably in the neighborhood of what is now Cortez, Colorado, Doctor Newberry noted ruins. He describes the Montezuma Valley, now one of the most fertile and beautiful places in the State, as the "Great Sage-plain." Again he says of the same country:

As we stood on its threshold (the Great Sage-plain) we looked far out over a great plain, to the eye limitless as the sea; the monotonous outline of its surface varied only by two or three small island-like mountains, so distant as scarcely to rise above the horizon line. Here we were to leave the lofty sierras of the Rocky Mountain system—and take our weary way across the arid expanse of the great western plateau . . .¹¹

Again a period elapses before there are any more explorations. The first real efforts to make a survey of the ruins is that of the Hayden Survey of 1874-75. In 1874 Mr. W. H. Jackson explored and described the ruins

¹¹ J. S. Newberry, *Report of the Exploring Expedition from Santa Fe, New Mexico, to the junction of the Grand and Green Rivers of the great Colorado of the West, 1859*, 83.

in the Rio Mancos Cañon. Mr. Ernest Ingersoll accompanied Mr. Jackson on this trip. In the Hayden report for 1875 the section devoted to a topographical report on the southeast section of the survey, Mr. Franklin Rhoda, assistant topographer, refers to ruins along the Piedra and the Pine rivers, and also those on the Animas River. There are no detailed descriptions but only brief references.

In 1875-76 Prof. W. H. Holmes, geologist to the Hayden Survey, made extensive examinations and reports on the ruins of Southwestern Colorado. These reports are full of excellent information and are illustrated in a manner that conveys a great deal of interest and permits the reader to visualize the ruins as Professor Holmes saw them.

The surprising feature of all of these explorations is that not one of the explorers thought it worth while to explore any of the cañons leading into Mancos Cañon. If they had done so the discovery of some of the most important ruins on Mesa Verde would have been made at a much earlier date.

It remained for Richard and Alfred Wetherill to be the fortunate ones who should discover many of the great structures that are not equaled anywhere in the United States. The Wetherill family had a ranch just a short distance below the town of Mancos and their cattle were permitted to range over great areas on both sides of the Mancos River. The guarding of these cattle devolved upon the members of the Wetherill family and in fulfilling this duty it took them many miles from the home ranch. During these rides they made successive discoveries of cliff houses, each seemingly more remarkable and startling than the previous one until one December day in 1888 Richard Wetherill and Charley Mason, riding through the low tree growth, came out onto what is now known as the Sun Temple point, and there, across the cañon, their eyes beheld the Cliff Palace. They were the first white men to see this marvelous group of buildings and it could not but appear to be the ruins of some huge palace and hence they so named it.

On the same day they discovered, in another cañon not far distant another group which they named Spruce Tree House, from a spruce tree growing in one of the kivas.

From that time on the work of discovery went on and they also did a great deal of excavating. A good sized collection gathered by them is now safely lodged in the State Museum at Denver.

In 1889 Mr. Fred H. Chapin visited the Wetherill family and was guided to all of the principal ruins in the Mancos Cañon and on the Mesa Verde. From this visit he was enabled to write a most interesting and charming non-technical description of the ruins and the surrounding country. (See bibliography.)

In 1891 Dr. W. R. Birdsall visited the Mesa Verde and afterwards wrote a descriptive paper on the ruins which was published as a bulletin of the American Geographical Society.

During the summer and autumn of 1891 Baron Gustav Nordenskiöld, of Stockholm, attracted by the stories of the wonders of the Mesa Verde and the surrounding country, spent several months with the Wetherills in excavating and making collections from the principal ruins. This was the first scientific excavating done on the Mesa. The collections were later sent to Stockholm, Sweden, and are now on exhibition there. In 1923 Baron Nordenskiöld published the results of his research in a magnificent and monumental work entitled *The Cliff Dwellers of the Mesa Verde*. This publication has long been the standard authority upon the region.

After the Mesa became better known there were many visitors to it. The trip was arduous and full of hardships but that did not deter adventurous spirits from visiting and enjoying this remarkable spot.

Dr. J. Walter Fewkes, now chief of the Bureau of American Ethnology, was one of the early visitors and this was probably the inspiration which finally ended in his becoming the greatest authority, through his excavations and publications, on the ruins in that region. Among the men associated with Doctor Fewkes we have many that are now leading American anthropologists. Dr. Edgar L. Hewett, director of the School of American Research, of Santa Fe, New Mexico, was also one of the early visitors.

The writer made his first trip into the Mesa Verde in 1904.

By an act of Congress approved June 29th, 1906 (34 Stat., 616) certain tracts of land in Montezuma County, Colorado, adjacent to the Southern Ute Indian reservation were reserved and set apart as a public reservation to be known as the "Mesa Verde National Park." The area of this park is 66.2 square miles. Thus was created one of the greatest national playgrounds in the world. This action was brought about by the concerted efforts of Dr. Edgar L. Hewett, director of the School of American Archaeology, of Santa Fe, New Mexico; Mrs. Gilbert McClurg, of Colorado Springs, Colorado; Mrs. Lucy E. Peabody, of Denver, Colorado; Mrs. Charles A. Eldridge, of Colorado Springs, Colorado; The Colorado Cliff Dwellers Association and others who were interested in the subject.

In the bill setting aside the lands for the park one finds the following figures that are of interest: "The area of this tract is 66.2 square miles, or 42,376 acres, and the altitude of the highest point, Point Lookout, is 8,700 feet above sea level and 2,000 feet above the Montezuma Valley, the southern rim of which follows the park boundary on the north for miles."¹²

In 1908 Dr. J. Walter Fewkes began the work of excavation in the park. The problem that he took up and finished was that of excavating, repairing and studying the Spruce Tree House. The work was done under the Smithsonian Institution at the request of the Secretary of the Interior, who allotted \$2,000 for the work. (See bibliography for report of this season's work.)

In the same year Dr. Edgar L. Hewett visited the park with a group of ten students, who pursued studies of the various ruins there. Included in this group were Dr. Sylvanus G. Morley, now director of archaeological research in Central America for the Carnegie Institution; Dr. A. V. Kidder, who is internationally known as the greatest authority on the "Basket-maker" culture and also for his research at Pecos, New Mexico, and in other places in

¹² Hans M. Randolph, *Report of the Superintendent of the Mesa Verde National Park* (Department of the Interior, 1908).

Arizona, New Mexico, and Southeastern Utah; Mr. Jesse L. Nusbaum, present superintendent of the Mesa Verde Park; Mr. Neil M. Judd, curator of American archaeology of the National Museum of Washington, D. C.; and others whom the writer cannot recall at this time. Later they adjourned to the Cannonball ruin for excavation and study.

In 1909 Doctor Fewkes again took up a problem of excavating, repairing and studying another ruin, and Cliff Palace was selected. During the work he had as a volunteer assistant Mr. R. G. Fuller of the Peabody Museum, who, with Mr. F. K. Vreeland, of Montclair, New Jersey, contributed many of the photographs used in the report on the work. (See bibliography.)

From 1909 Doctor Fewkes continued excavating on the Mesa Verde, taking up new problems and extending our knowledge of the buildings and the people who formerly lived in them. Amongst the groups excavated by him in addition to those already named, are the Sun Temple, Far View House, Oak Tree House, Cedar Tree Tower, New Fire House and accompanying buildings of the group, and others of both the cliff and pueblo types. During 1919, Dr. Ralph Linton of the Field Museum acted as assistant to Doctor Fewkes; during 1920 the writer was the Doctor's assistant.

In addition to his work on the Mesa, Doctor Fewkes also explored much of the country lying west and northwest of the park, giving us much valuable information concerning the ruins in that part of Colorado. (See bibliography.)

The State Historical and Natural History Society of Colorado has had archaeological expeditions in Southwestern Colorado for five consecutive years. The first two (1921-22) were joint expeditions with the University of Denver.

In 1921 and 1922 special attention was given to excavation and study of pithouse, pre-pueblo and pueblo ruins in the Pagosa-Piedra region, which extends from Pagosa Springs 22 miles west to the Piedra River. During the summer of 1923 and 1924 the society made a thorough reconnaissance of the southwestern part of our state and material is now available for a complete archaeological map of that region. In this work the writer had most valuable

assistance in the person of Mr. Frank H. H. Roberts and his brother, Mr. Henry B. Roberts.

In 1924 a part of the reconnaissance program included a brief survey of the ruins in Moffat County, in the northwestern part of our state, and disclosed the fact that there are many Basket-maker ruins in that section.

The 1925 expedition confined its efforts to an intensive study of the pithouse remains on the banks of the Piedra River, and a short survey of the huge pueblo mounds near Spargo, Colorado.

All of the expeditions were under the writer's direction and are a part of his explorations from 1904 to 1925, in Southwestern Colorado.

Mr. Earl Morris has also conducted reconnaissance and excavations in Colorado, especially in the Mancos Cañon, La Plata and Las Animas valleys.

In 1910 Mr. Jesse L. Nusbaum, under the direction of Dr. Edgar L. Hewett, repaired Balcony House in the Mesa Verde National Park. The work was financed by the Colorado Cliff Dweller Association, a group of public spirited women, with branch chapters in New York, Los Angeles, and other cities of the United States.

In 1908 the State Historical and Natural History Society of Colorado, the University of Colorado and the School of American Archaeology of Santa Fe, New Mexico, conducted an expedition in the McElmo Cañon country, taking for their problem the partial excavation of a large ruin called the Cannonball. The work was under the direction of Sylvanus G. Morley; Dr. A. J. Fynn was associated with Doctor Morley. Included in the personnel of the group were Mr. Jesse L. Nusbaum, Dr. A. V. Kidder, Mr. Neil M. Judd, Mr. K. M. Chapman and other men who have since become noted anthropologists.

From time to time since 1906 Dr. Edgar L. Hewett has made surveys and reconnaissances on Southwestern Colorado.

While this brief outline of the explorations of Colorado may have overlooked some of the work done, yet it was not the intention of the writer to ignore or leave out any scientific efforts of anyone entitled to such credit.

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CHAPTER VI

COMING OF THE WHITE MEN; EXPLORATION AND ACQUISITION

By LeRoy R. Hafen

SPANISH AND FRENCH EXPLORATION AND CONQUEST—LOUISIANA PURCHASE, PIKE, AND LONG—TRAPPERS AND THE FUR TRADE—EXPLORERS AND TRAVELERS—SUCCESSIVE POLITICAL JURISDICTIONS.

SPANISH AND FRENCH EXPLORATION AND CONQUEST

A new epoch in world history was inaugurated by the discovery of America. Most European nations were slow to recognize the importance of this event and were ill prepared to take advantage of the opportunities afforded. Spain, however, had achieved a political and religious unity by 1492 and was prepared to launch out into the field of colonization. France and England were a full century behind this Hispanic nation in the field of New World conquest. The very year after the Columbus discovery, Spain sent her gallant captain on a second voyage with fifteen hundred emigrants to begin the permanent occupation of the new land. During the first twenty-five years the West Indies were the center of Spanish activity, but with the conquest of Mexico by Cortez in 1519-21 a new base for expansion was acquired on the mainland. Mexico City became the first capital of North America and from this center lines of conquest radiated in every direction.¹ In a remarkably short time Spanish conquistadors were penetrating far into the northern interior. Within fifty years after the discovery of America by Columbus the Colorado River had been visited and the mountains and plains of

¹ H. E. Bolton and T. M. Marshall, *The Colonization of North America* is perhaps the best reference book upon the Spanish expansion in the New World.

Western United States were known and described by Spanish explorers and chroniclers.

The outstanding expedition from Mexico City to the northern interior during the first half of the sixteenth century was led by Francisco Coronado. The immediate cause of this large and splendid expedition was the report of a ship-wrecked wayfarer, Cabeza de Vaca, who had wandered for eight years over the Texas plains.²

Vaca was one of the four hundred persons who accompanied Narvaez in 1528 to conquer and colonize Florida. Discouragement and disaster came to these armored knights in the Florida wilds and the survivors finally killed their horses and made a little fleet of horsehide boats in which to escape to Mexico, which they thought to be not far away. The five frail boats skirted the shore of the Gulf of Mexico and at the mouth of the Mississippi were driven far out to sea and separated. Some were lost while others were wrecked upon the Texas shore. Here the remnant found succor among the Indians, but disease and starvation thinned their ranks. Vaca became a medicine man and saved himself and others by his success in healing the sick. For nearly six years Vaca lived as a slave among the Indians, yet ever dreaming of escape and of ultimate rescue among his countrymen in Mexico. Three companions, including the negro Stephen, remained to accompany Vaca. Various attempts to escape ended in failure, but finally in Western Texas they came among friendly Indians with whom Vaca's medicinal powers gave him rating as a son of heaven. His journey now became a triumphal march with hundreds of Indians catering to his every wish in humble reverence. From the Rio Grande Valley in the vicinity of present El Paso they crossed over to Sonora on the Pacific slope and, continuing southward, reached Mexico City in the summer of 1636.

Vaca did not reach the present territory of Colorado but the account of his journey, together with other tales told by Indians of the frontier, led to exploration in this direction. The wealth found in Mexico, Central America, and

² A. F. Bandelier, ed., *The Journey of Alvar Nunez Cabeza de Vaca*.

Peru whetted the Spaniard's appetite for gold and stimulated his imagination. Other Mexicos and other Perus there surely must be. No tale of great wealth was too fabulous to be accepted. There arose on the northern horizon the "Seven Cities of Cibola" with jewel-studded doors and whole streets of goldsmiths. The Indian storytellers wove their tales in designs that most delighted the Spanish hearers.

The viceroy, Mendoza, planned for the conquest of the jeweled cities to the north, and chose Francisco Coronado to lead the military expedition.³ At Culiacan, the northern outpost of New Spain, Coronado halted to establish authority over his province of New Galicia, while he sent on an advance party to explore the approaches to the golden cities. Fray Marcos, who had assisted Pizarro in conquering Peru, had command of this scouting party that turned its face to the north in 1539. The negro Stephen, former companion of Vaca, acted as guide. Friendship and welcome greeted the invaders at first, but soon they encountered hostility, and in one of the Zuni villages the negro met death at the hands of the hostile inhabitants. Fray Marcos did not enter the cities but from a distance saw the outline of pueblo towns which loomed to his inflamed imagination as rich and mighty cities. Marcos returned to Coronado with a glowing account of the fabulous wealth within his reach. The news spread with accelerated speed, and the splendor grew with the telling. Presently three hundred men were enlisted to assist Coronado in gathering the wealth to be had for the taking. At Compostela, on the Gulf of California, the company was assembled in February, 1540. The Viceroy of New Spain traveled the long miles from Mexico City to participate in the ceremonies and to view the gorgeous parade that preceded the departure.

"It was the most brilliant review yet held in New Spain. Most of the cavaliers were astride of the best horses from the stock farms, and had equipped them with colored blankets trailing almost to the ground, besides leather armor and silver-mounted harness. Their own mail was

³ G. P. Winship, *The Journey of Coronado*.

polished like woven silver, and the tips of their lances, held erect, flickered in the sun like sparks of fire. Their helmets were of iron or tough bullhide. In their train marched the foot soldiers armed with crossbow and arquebus, some, too, with swords and shield. The third division of the army was composed of several hundred Indian allies, their naked bodies splashed with black, ocher, and vermillion; and their faces painted terribly for war; surmounted by the green and yellow and crimson plumage of parrots. At royal expense the expedition was equipped with pack-mules, cannon and a thousand horses. For food on the way and to stock the new country there were droves of cattle and sheep, goats and swine. Leading all this splendor, and dulling it by his own brighter glory, rode Coronado in golden armor.”⁴

Three vessels under command of Alarcon were sent up the coast to coöperate with the land expedition. They followed the Gulf of California to the mouth of the Colorado River and continued up that stream to the vicinity of present Yuma. The land expedition journeyed northward along the Pacific slope to the Gila River and then northeastward to the Zuni towns of New Mexico. These first villages were an extreme disappointment. Castañeda, the historian of the expedition, records: “When they saw the first village, which was Cibola, such were the curses that some hurled at Friar Marcos that I pray God may protect him from them.”⁵

From this point a detachment of Coronado’s army was sent to the northwest to view a large river said by the Indians to flow through an enormous canyon. Cardenas, leader of this party, was the first white man to gaze upon the splendor of the Grand Canyon of the Colorado. His party attempted to descend to the water, but without success.

Ulloa, with orders from Cortez, the conqueror of Mexico, had sailed to the head of the Gulf of California the previous year (1539) and was the first white man to see the Colorado River. In 1540 Melchior Diaz, one of

⁴ H. E. Bolton, *Spanish Borderlands*, 88.

⁵ Winship, *op. cit.*, 23.

Coronado's lieutenants, had reached the river a little above its mouth, when trying to make a junction with Alarcon's ships. But not one of the three—Ulloa, Alarcon, or Diaz—had beheld the Grand Canyon. Diaz had called the river, *Rio del Tison* (Firebrand River) from the fact that the naked Indians of that locality carried firebrands with which to warm themselves in cold weather. But the name given this river by Diaz was not to persist. Instead, the Spanish word descriptive of the water and of much of the country through which it flows, was adopted—Colorado (reddish brown color). This mighty river was at a later day to give its name to the state in which it rises.

The account of Coronado's further journey is a long story of disappointment and misfortune. The pueblos of New Mexico had no wealth with which to quench the Spanish thirst for gold. Native opposition or uprising met with severe chastisement and cruel reprisal. Winter approached and nothing had been gained except control of a few stolid villages with meagre supplies of food. By cruel treatment and broken honor the Spaniard became known as a false man whose promise was but empty words; and the Indians planned to rid themselves of their unwelcome guests. Stories began to be told of wealthy lands to the eastward, and the drowning Spaniards snatched at straws. Quivira was the land of wealth the white man sought, and willing Indians would lead the way. El Turko was a native of the place and on the great rivers he had ridden in huge canoes whose high prows were of carved gold. The common folk dined with dishes of gold and silver. Such was his story.

In the spring of 1541 El Turko led the way and Coronado set out for golden Quivira. Turning eastward, they tramped the Texas plains, moving on toward another cavalcade upon an equally futile mission. De Soto had braved the Florida swamps and traversed the wilderness to the Mississippi River. Beyond that he was now coursing the Arkansas Valley in the vain search for gold. Although these splendid expeditions did not meet they had much in common—disappointment, disaster, despair. They were exploding the "Northern Mysteries" and giving the lie to tales of fabulous wealth.

Increasing facts disproved the stories of El Turko and he finally confessed the design to lead the Spaniards away and lose them in the prairie. From Texas the expedition turned north and east and reached Quivira in present Kansas, but no wealth was found. The Indian guide was strangled and the disgusted Spaniards turned their faces toward the pueblo towns on the Rio Grande. Their homeward course was a nearly direct line to the southwest. It is believed that Coronado did not enter Colorado territory, but he may possibly have touched the southeastern corner of the state upon this dismal retreat of 1541. Winter was again spent in present New Mexico and when spring opened the remnant of the expedition straggled back to Mexico to acknowledge its defeat.

The story of the Coronado expedition deserves a place in Colorado history. During the sixteenth century the whole of Western America was Spanish domain, and the outstanding exploration of this northern interior was made by Coronado.

With the defeat and disaster of the Coronado and the De Soto expeditions a decided check was given to northern exploration. Spanish energy was now directed to the development of resources nearer the base in Mexico City. But the mining and stockraising frontier gradually pushed northward and just at the end of the sixteenth century a great step was taken toward Colorado. This marked projection of the Spanish frontier came in the occupation of New Mexico under Oñate.

The rumor that Drake, the English explorer and raider, had discovered a strait through North America had induced the king of Spain to order the occupation of New Mexico as a step toward that mythical passageway. The geographical ideas regarding North America were as yet very hazy. California was thought to be an island, and the "Strait of Anian" was supposed to be a direct waterway through North America. The importance of such a waterway was quickly grasped and Spain was naturally eager to possess and occupy it.

The colonists with Oñate began the settlement of New Mexico in 1598, while their leader explored the country to the east and west. Though Oñate re-explored much of the

country traversed by Coronado, he did not enter Colorado territory.⁶ The occupation of New Mexico was somewhat of a disappointment to the Spaniards. The "Strait of Anian" was not discovered, hopes of finding rich minerals in New Mexico had failed, and the province continued largely as a missionary field only.

We have the record of but one expedition that penetrated Colorado territory before the eighteenth century. This was led by Juan de Archuleta and came from New Mexico to the Indian land of El Quartelejo in Eastern Colorado. This first entry (so far as we have record) of Colorado soil by white men took place in the middle of the seventeenth century. The Spanish party was despatched to recover Indians who had run away from their masters and obligations in Taos. "The route followed can only be conjectured."⁷ The expedition was a minor incident in New Mexico history, and although of some consequence to Colorado it was of no immediate or lasting importance to our state.

During the seventeenth century the power of Spain gradually declined and France and England became the leading powers of Europe. Colonization in the New World by both of these rival leaders, France and England, had been undertaken at the beginning of the seventeenth century. The eastern half of the United States was the field of their activities during the earlier years, and Spain retained her undisputed sway in the West. But with the eighteenth century came an international conflict for Western North America. Four world powers were concerned—Spain, France, England and Russia. Toward the end of that century another power, the most important of all, was to be born—the United States of America. This new prodigy was to advance with rapid strides and replace all competitors. This last drama, however, is in a nineteenth

⁶ G. P. Hammond, of the University of Arizona, has made the most thorough study of Onate and his work. He has found no evidence of Onate's having reached Colorado territory. See Hammond's "Onate and the founding of New Mexico," in the *New Mexico Historical Review*, Vol. I.

⁷ A. B. Thomas, "Spanish Expeditions into Colorado" in the *Colorado Magazine*, Vol. I, 292.

century setting. For the present let us go back to the eighteenth century and note some of the forces at work in Western North America, especially as they affected the territory later to become our Colorado.

France did not plant permanent colonies in the New World until the beginning of the seventeenth century, and not until the eighteenth did she become a power to be reckoned with beyond the Mississippi. True, Marquette and Joliet had come from Canada and followed the Mississippi to the Arkansas branch in 1673 and a decade later La Salle had floated down the "Father of Waters" to its mouth and taken formal possession of the interior basin, naming it "Louisiana" in honor of his king.⁸ But La Salle's attempt to plant a colony on the gulf coast ended in failure and this gallant pioneer of France met a tragic death in the Texas wilds. However, the ideas of a great man live after him and La Salle's plan did not die. His project was taken up by Iberville and in the last year of the seventeenth century the flag of France was raised and the permanent occupation of the Gulf Coast was begun. A post was presently established at Mobile Bay and in 1718 New Orleans was founded. French traders and trappers began to launch forth in every direction. In a short time isolated traders had penetrated westward to the Rio Grande from the Louisiana base, while fearless *coureurs de bois* (rangers of the forest) were careering westward to the borders of New Spain. Stories of these French incursions into territory claimed by Spain drifted into Mexico and the international conflict was on.

Let us trace first the western expeditions of the French that approached or penetrated Colorado territory, then later we shall follow the Spanish countermovements.

The year after the founding of New Orleans, La Harpe was sent to seek out the sources of the Red River and to learn of the Indian tribes that roamed over the territory adjacent to New Mexico. In 1719 he established a post on the bend of the Red River near the southeastern corner of Oklahoma and then crossed northward to the mouth of the Canadian River. In the meantime Du Rivage was

⁸ R. G. Thwaites, *France in America*.

sent farther up the Red River to explore the territory near its headwaters. During this same year Du Tisné was approaching Colorado from the Illinois country. He explored portions of the Osage and Arkansas rivers, and visited the Pawnees on the latter stream. He made an alliance with these Indians, bought Spanish horses from them, and raised a French flag in their villages.⁹ No other nation manifested the ability exhibited by France in dealing with the Indian. Her authorized agents as well as the individual *courreurs de bois* possessed a diplomacy and a plasticity of policy that adapted itself to Indian customs and life.

In the years immediately following the Spanish exploration of Villasur, in 1720 (to be discussed below), the French tried to communicate with New Mexico and to fore-stall any hostile movement by the Spanish. For this purpose Bourgmont, who had lived some years among the Missouri Indians, was sent westward from the Illinois country. In 1724 he went up the Missouri River, turned westward through Kansas and probably reached Colorado. If so, he was the first Frenchman of whom we have record to visit Colorado territory. He was opening a way to New Mexico, which to the French was a land of gold and silver, and was on the pathway to the South Sea.

During the decade following Bourgmont's expedition of 1724 little further advance was made by the French, but traders were carrying on considerable traffic with the Plains Indians. Mules stolen from the Spanish settlements by the Indians figured prominently in this trade. But Mexico beckoned. "To the adventurer it was a land promising gold and silver and a path to the South Sea; to the merchant it offered rich profits in trade."¹⁰ The misty haze of distance and uncertainty gave play to the imagination, and the splendor and riches of Santa Fé were magnified. As the pueblos had appeared to the credulous eyes of Fray Marcos as the "Seven Cities of Cibola," so now the French voyageurs and adventurers saw to the southwest, wealth and glory. Obstacles, however, were in their path. The

⁹ Bolton and Marshall, op. cit., 283.

¹⁰ Ibid., 285.

monopolistic and exclusive policy of Spain still persisted. Through jealousy and narrowness she was blinded to the benefits of international commerce; hence, intruders into New Mexico could not expect a cordial reception. Another obstacle to trade and communication with New Spain was the barrier of hostile Indian tribes. The Red River highway was blocked by the roving Apaches, who were mortal enemies of the tribes to the east.

In 1739 the Mallet brothers, French traders, led a party from the Missouri River to Santa Fé. The route taken was along the Platte River in Nebraska to about the 100th meridian, thence southwest to the upper waters of the Republican, then southward through Colorado territory to the Arkansas River in the vicinity of the Purgatory, and thence to Santa Fé. After a nine months' stay the party divided and returned by a route which lay to the south of present Colorado. The success of the Mallet party in reaching and returning from Santa Fé encouraged others to attempt the trip. Governor Bienville of Louisiana sent out Fabry to open a route up the Canadian and to explore the Far West, but he did not reach Santa Fé.

In 1746 or 1747 the Arkansas route was made safe for travel by a treaty between the Comanches and their eastern enemies. Many expeditions, both private and official, now turned toward New Mexico. In 1749 Pierre Satren led a party to Santa Fé by way of the Arkansas route, and in the year following another party traversed the same route through Colorado territory.

About this time a peace was made between the Comanches and Pawnees which opened the country north of the Platte River, and expeditions from Canada now traversed Colorado soil on their way to New Mexico. In 1751 Jean Chapuis came with a party of nine from the Illinois country with a commission from the commander of Fort Chartres (at the mouth of the Missouri River). He proposed a regular caravan trade with military escort between Illinois and Santa Fé through Colorado territory. The advances of the French, however, met with rebuffs from the self-sufficient Spanish, and Chapuis was arrested and taken as prisoner to Mexico City, where he remained

for months in confinement.¹¹ One of these French expeditions toward New Mexico is said to have erected a temporary store on the upper Arkansas for purposes of trade with the Indians and with the Spaniards of New Mexico. These French traders also were arrested as interlopers and their merchandise was confiscated; but subsequently when the case was tried at Havana the property was restored to the Frenchmen on the ground that their store was within the boundaries of Louisiana. This would indicate that their store was in the vicinity of modern Pueblo, and therefore was, perhaps, the first building erected on Colorado soil.¹²

La Verendrye played a prominent role for France in the Northwest. Seeking a route to the Western Sea, he planned a line of posts along the waterways of Lake Superior. In 1738 he led an expedition southwestward to the mountains. Four years later his son, Pierre, visited the Cheyennes and Crows immediately to the north of Colorado, where he beheld the Rocky Mountains on January 1, 1743, from a point on the North Platte River.¹³

The French had thus during the first half of the eighteenth century reached the Rocky Mountains by every stream between the Red River and the Saskatchewan. Their trappers were on friendly terms with most of the Indian tribes and the fur trade was being exploited with profit.

In the Old World, however, France was not so successful as in the New. The "half century of conflict" was depleting her resources and when the fourth of her series of wars with England and other powers came on, she was engaged in the final struggle for New World dominion. The Peace of Paris of 1763 which brought to a close the French and Indian War (Seven Years War), provided for the elimination of France from continental North America. England was ceded the French possessions east of the Mississippi and the territory to the west was transferred to Spain in order to prevent its falling into the powerful hands of

¹¹ *Ibid.*, 286.

¹² These data are from Amos Stoddard's *Sketches of Louisiana*, quoted in Chittenden's *American Fur Trade of the Far West*, Vol. II, 490.

¹³ Bolton and Marshall, *op. cit.*, 288.

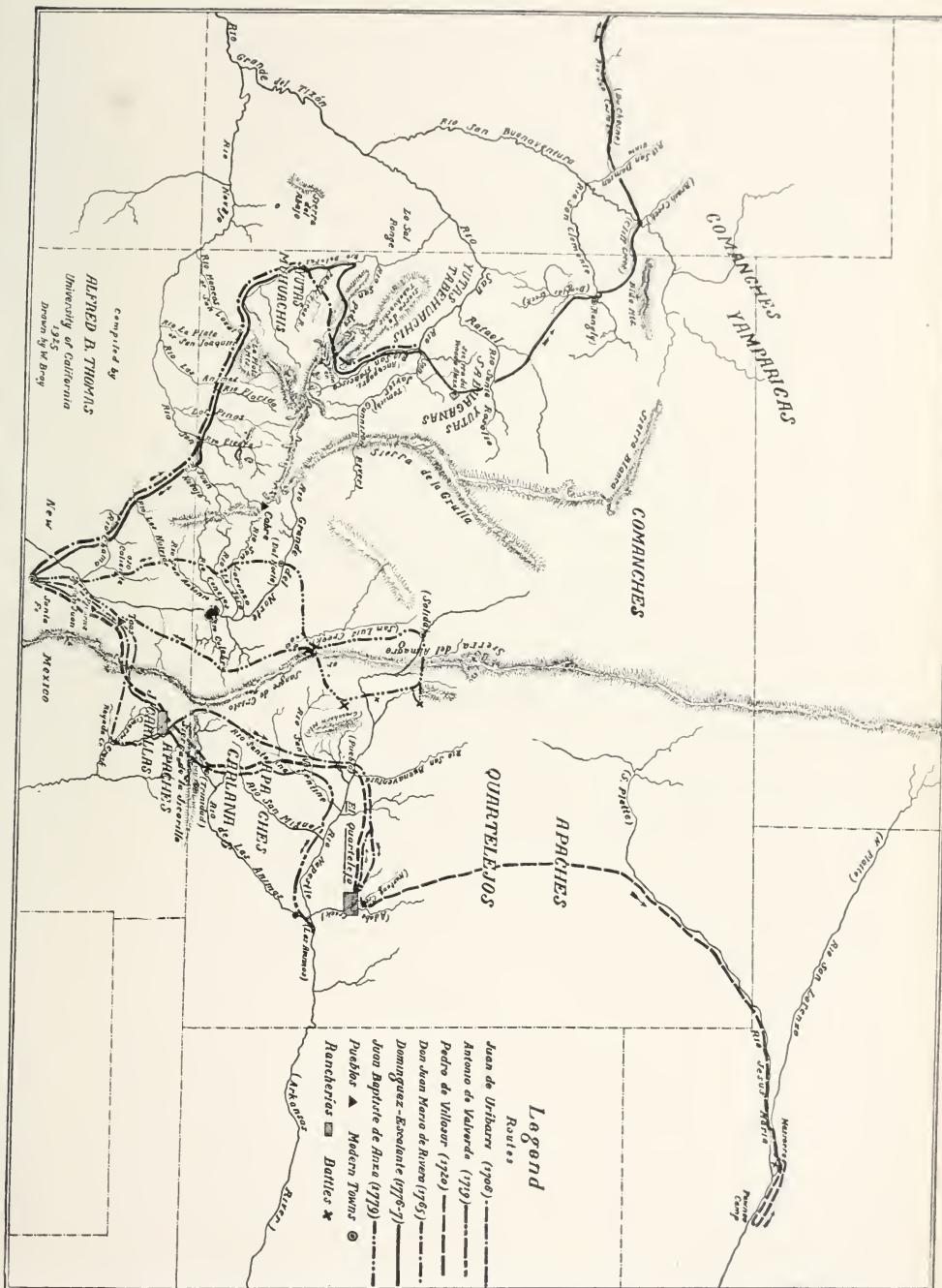
England. The western boundary of the Louisiana territory of France had not been definitely drawn, but it was generally considered as being along the continental divide through the country to the north of the Spanish domain of New Mexico. But how far north and east did New Mexico extend? Much of present Colorado was debatable soil. The eastern portion of the present State has generally been considered as having been French territory during the half century or more preceding 1763. In this year, however, the boundary line was blotted out and Colorado, along with the rest of Western United States, became a part of New Spain.

Though France withdrew, her sons remained. These hardy adventurers kept in the vanguard of exploration and fur-trade exploitation. Wedded to the Indian and the forest they became a distinct and unique race. The blood of the primitive Gaul and the aboriginal American mixed freely and in the mixture the primitive predominated. No trapping party or exploring expedition in the Colorado of a century ago was complete without its French creole guides and hunters; and now that the frontier has been banished from our State, this near-primitive American type has followed the ever retreating frontier into the Canadian Northwest.

Though the day of the French in Western America was rather brief, the Spaniard was vouchsafed a longer life. Already, we have spoken of the Spanish northward advance from Mexico City and of the colonization of New Mexico. Because of the French menace, eastward, Spain again became active in the eighteenth century and sent various expeditions into Colorado territory.

The first eighteenth-century Spanish expedition into present Colorado was conducted by Juan de Uribarri in 1706.¹⁴ Forty Spaniards and one hundred Indian allies accompanied this leader as he set forth to recover subject Indians who had fled from the New Mexico Pueblos. Uribarri moved eastward from Taos and then northward over the divide to the headwaters of the Purgatory River

¹⁴ In tracing the Uribarri and successive Spanish expeditions into Colorado I follow the data of A. B. Thomas in *Colorado Magazine*, Vol. I, 292-300.



EARLY SPANISH TRAILS INTO COLORADO TERRITORY

in Western Las Animas County. Continuing to the north he crossed Cuchara Pass just to the west of the Spanish Peaks, those landmarks famous to early explorers and travelers. Skirting the eastern foothills of the Greenhorn mountains the party arrived upon the Arkansas River near present Pueblo. This was perhaps the first visit of white men to this portion of the Arkansas Valley (coming some years before the French incursions). From this point the expedition traveled eastward for five days, arriving at El Quartejo, perhaps in our present Cheyenne County. Upon this eastern expedition the Spanish heard of French traders who were supplying the Pawnees with firearms. A gun of French make was exhibited by the Indians in proof of their declarations. Here at El Quartejo in Eastern Colorado, Uribarri took formal possession of the territory. With great ceremony he claimed the country as within the domain of his sovereign, Philip V, and gave it the favorite Spanish name of "Santo Domingo." After the runaway Indians from New Mexico were assembled, the homeward journey was made over the same route taken on the outward course, and Santa Fé was reached in safety. Colorado territory had been appropriately claimed and duly named in characteristic Spanish fashion. The name "Santo Domingo" did not long persist, but just 155 years later, and 65 years ago, our territory was rechristened with another Spanish name, a permanent heritage from Old Spain —Colorado.

In 1719 the Governor of New Mexico himself led a pretentious expedition over Colorado soil in an effort to punish the Ute and Comanche Indians. Governor Valverde had in his command some six hundred men, one-sixth of whom were Spaniards, and the remainder, Indian allies. The first part of the route was in the footsteps of Uribarri. The divide was crossed to the headwaters of the Purgatory where camp was made near the present site of Trinidad. The party continued northward along the foothills and reached the Arkansas above Pueblo. Here they crossed and continued northeast to Fountain Creek where another camp was made. "From this point on, their directions in some details are confusing, but since they traveled in a generally eastern direction and continually speak of a river, we may

conclude that they followed the Arkansas and made occasional sallies in search of the Utes and Comanches."¹⁵ In the vicinity of present Las Animas large numbers of Indians from El Quartelejo were encountered, among whom was one who was suffering from a gunshot wound inflicted by Frenchmen upon the South Platte River in Northern Colorado. The alarm engendered by this fresh evidence of French incursion was expressed in a report to the Viceroy in Mexico City. Similar reports were coming in to the Spanish officials from along the Texan frontier. As a consequence a council of war was called at Mexico City in January, 1720. This resulted in the issuance of orders to Governor Valverde to conduct a reconnaissance of the French position to the northeast of New Mexico. The Governor did not command the expedition in person, as ordered, but intrusted the leadership to his lieutenant, Don Pedro de Villasur.

Fifty armed Spaniards composed the corps and in the train were sixty or seventy Indians armed with bows and arrows. It was anticipated that some additional help would be obtained from friendly Apaches of El Quartelejo, but even should this assistance be obtained the force was too meagre for offensive action against the powerful Pawnees, reënforced with firearms from the French. This would indicate that negotiation was to be depended upon rather than offensive operations. Articles for exchange were taken and a heavy mule train laden with provisions accompanied the troops. Silver cups and saucers, forks and spoons, and a candlestick and inkstand of the same metal, were among Villasur's personal effects, and reveal somewhat the temper of the Spanish Don. Various minor items seem to indicate that he was rather unacquainted with the character of the march and the nature of the country he was to traverse.

The Villasur command left Santa Fé June 15, 1720, on its ill-starred expedition.¹⁶ The route followed to El

¹⁵ *Ibid.*, 294.

¹⁶ A. F. Bandelier, "The Expedition of Pedro de Villasur" in *Papers of the Archaeological Institute of America*, American Series V, pages 176-206.

Quartelejo in Eastern Colorado was most probably that taken by Governor Valverde the previous year. From this place the party turned northward to the South Platte River, which they called the "Rio Jesus Maria."

On the north bank of the Platte River in Western Nebraska, Villasur saw the villages of the Pawnees. A messenger was sent to them but the Pawnees did not permit him to return. However, on the next day several Pawnees came to the Spanish camp but they could not be understood. It is very likely that they did not care to be understood, but had visited Villasur merely to learn the strength of his command. The Spaniards now grew suspicious and retreated a day's march, crossing the South Platte and camping in the tall grass. Villasur could scarcely have picked a poorer position for his encampment. The Indians and their French companions were able to creep upon the Spaniards under cover of night and launch a vigorous attack at sunrise. The Spaniards were victims of their own folly. In addition to camping in an indefensible position they had intrusted the night watch to lukewarm Indian allies and retired to sleep soundly in utter unconcern. It was subsequently ascertained that the barking of a dog and the sound of men swimming the river had been heard but these fatal warnings were not reported to the commander. This makes pertinent the question, To whom were the Apaches really faithful allies?

It is not necessary to record here the details of the battle—or better, perhaps, massacre—which broke with the day. Flights of arrows and reports of muskets were the first announcements of the attack. The confusion was terrible, and the Spaniards were doomed. Only a half dozen escaped to tell the tale. Their story created the utmost excitement in New Mexico, for nearly half of the garrison of Santa Fé had perished in this massacre. This was to have an important effect in preventing further excursions into Colorado territory. These early expeditions of Uribarri, Valverde and Villasur had revealed Eastern Colorado to the Spaniard, but the disaster of 1720 precluded the occupation of the region. They also were important in that they revealed to the French the road to Santa Fé and resulted in the Mallet and subsequent expeditions to

the Spanish outposts by way of Colorado that have been discussed above. They were the precursors of the "Santa Fé Trail" through Southeastern Colorado.

Another Spanish punitive expedition against the Indians entered Colorado about the middle of the eighteenth century. This was led by Bustamente y Tagle and followed down the Arkansas River. Nothing of consequence resulted from it. With the elimination of the French in 1763 the danger from that source was removed and Spain did not become active toward the Northeast of New Mexico until danger from another nation threatened. This menace came in the form of the Pike expedition and resulted in renewed Spanish activity. We shall discuss this at a later stage of our story.

It cannot be determined at what date the earliest Spanish incursions were made into south-central and western Colorado. The relations of the New Mexicans with the Indians were such that little parties of Spanish traders undoubtedly penetrated this region at various times during the eighteenth century if not at an earlier date. When Escalante made his famous journey through Western Colorado in 1776 practically all the streams in Southwestern Colorado had already received Spanish names from former expeditions. These previous parties had pursued various objects. Some were prospecting for gold; some were chastising marauding and thieving Indians; while others were undisguised slave-catching expeditions. If records of these early incursions into Colorado were made they have not survived and we can only speculate upon their routes and extent. Perhaps the first expedition of which we have definite knowledge was sent out by Governor Cachupin in 1765. This was led by Don Juan Maria de Rivera. He skirted the foothills of the San Juan Mountains and secured samples of ore in the canyons of the La Plata. From the San Juan basin he crossed over to the Dolores River and thence to the San Miguel. After crossing the plateau to the eastward he descended the Uncompahgre River to the Gunnison. Here as a sign and a landmark he carved a cross on a cottonwood tree. The further course of the expedition is unknown but it is presumed that this was

the farthest point north reached, and that the return was over the route taken on the outward journey.

The general route of Rivera was taken by another party ten years later. Whether this was a private venture or an official expedition is not known, but reference is made to it in the Escalante diary.

As noted above, the French danger had been removed in 1763, but at about the same time another menace loomed upon the Spanish horizon. Russia and England began to appear as threatening powers in the Pacific Northwest. Spain made a grand effort to counteract the danger and secure the territory she had explored and claimed. The Spanish missions were planted in Alta California as a counter movement against the Russian advance. The necessity next became urgent for a shorter and better route between these outposts in California and the settlements in New Mexico. Such were the conditions and motives that gave rise to the most famous eighteenth century expedition into Colorado. A new path was to be broken from New Mexico to California and the task was entrusted to a little party led by two friars—Dominguez and Escalante.

In the very month and year when the Declaration of Independence was being signed by pioneers of Freedom at Philadelphia, these Spanish pioneers of discovery were setting out to explore a region soon to become the home of sons of the American Revolution. To Colorado the year 1776 has a special significance. Just one hundred years after the liberty bell flung forth its message and Escalante penetrated our Western Slope a new state was born. The message of the bell was in its constitution, and the spirit of the explorer in the blood of the newcome pioneer. Rich was the heritage of the Centennial State and the birthright was not squandered. This semi-centennial year (1926) may be considered as closing a period of free and vigorous adolescence, and the great productive period of maturity is yet ahead. Present and future citizens shall measure the strides and determine the glory which shall reveal the Greater Colorado.

But back again a sesqui-century to 1776.

Twelve companions accompanied the two Spanish padres as they set forth from Santa Fé in this eventful

July. They took a northwestward course and entered Colorado near the present site of Pagosa Junction on August 5th. In following a generally westward course to the vicinity of present Dolores the various affluents of the San Juan were crossed. These beautiful streams, rushing down from the snow-clad San Juan range, were known to New Mexicans and had already received their musical Spanish names—Piedra Parada, Los Pinos, Florida, Las Animas, La Plata and Rio Mancos. From the Mancos River the party turned northward to the Rio de Nuestra Señora de los Dolores (River of Our Lady of Sorrows) and followed the general course of its valley northward for about seventy-five miles. In the gypsum country a few miles south of the town of Bedrock the country became so rough and the traveling so difficult that they decided to turn eastward in search of a better route and a competent Indian guide. In the vicinity of our town of Naturita they reached the San Miguel River (called by Escalante the San Pedro) and followed its valley to present Placerville. Upon crossing the Dallas Divide the great Uncompahgre Valley was entered. Escalante records in his journal: "We entered the pleasant valley of the river of San Francisco [Uncompahgre], called by the Yutas the Ancapagari, which the interpreter tells us means Colorado Lake, from the fact that near its source there is a spring of reddish water, hot and disagreeable to the taste. The plain through which this river runs is broad and level and a well traveled road passes through it."¹⁷ Down the broad valley they tramped to a point a little below present Montrose, when a northeastward course was taken which brought them to the Gunnison River just below the junction of its principal branches. Up the north fork of the Gunnison (called by them the "San Javier" and by the Indians "Tomichi") they went, seeking an Indian guide familiar with the country to the westward. The Indians encountered here attempted to dissuade the explorers from continuing, but the Spaniards were adamant. Finally a guide was obtained who led the

¹⁷ W. R. Harris, *The Catholic Church in Utah*, 143-4. The Escalante journal is translated and printed as Book II of this volume.

way to the northwest. After crossing the grand mesa, descent was made to the Colorado River at a point a few miles above our town of DeBeque. The expedition now turned in a more northerly direction, crossing the Roan Plateau and descending Douglas Canyon to the San Clemente (White River) at present Rangeley. From this point, on the 10th of September, they turned to the northwest and made their exit from Colorado territory. The further details of the Dominguez-Escalante expedition do not primarily concern us here, but a brief description of their further journey will be given. From the Green River the party turned westward, crossing the Wasatch Range and reaching Utah Lake. They now turned to the southwest reaching the Sevier and then the Virgin River in southwestern Utah. Here the lateness of the season and the fall of snow induced the explorers to finally abandon their objective and return to Santa Fé. An eastward course took them to the Colorado River, which was successfully forded at the "Crossing of the Fathers" in Northern Arizona. A stay was made at Zuni, and Santa Fé was reached on January 2, 1777.

Although the Dominguez-Escalante expedition failed in its immediate object of finding a route to the California missions, it was, nevertheless, of great importance to the regions traversed. It ranks as the outstanding exploration of Colorado and Utah before the coming of Fremont. Many of the place names of Colorado date back to this expedition, and the Escalante journal presents the first account and description of a vast inland region, portions of which are even today an almost unknown land. Spanish expeditions into Colorado thus far discussed, traversed either the eastern or the western portions of the State. The interesting, central mountainous region had seemed forbidding. And yet the Rio Grande Valley appears as a rather natural avenue of approach for at least a part of the way. There doubtless were earlier incursions into our great San Luis Valley, but the first of which we have definite record occurred in 1779. Juan Bautista de Anza, the leader of this expedition, had won fame in other fields before coming to Colorado. He it was who led that pioneer band of Spanish colonists from Sonora to the founding of San Francisco on

the Golden Gate in 1776. Three years later he was governor of New Mexico and was leading a military force northward into our San Luis Valley. The purpose of this expedition was to punish Chief Cuerno Verde (Greenhorn) and his Comanches, who had been murdering Spanish settlers. Anza led an army of 645 men from Santa Fé to accomplish this task. A northward course was taken to the west of the Rio Grande River, and the diary mentions affluents of this river which are easily identifiable today—Las Nutrias, Conejos, La Jara, Los Tumbres (Rio Alamo) and San Lorenzo (Piedra Pintada Creek). The Rio Grande was crossed in the vicinity of present Del Norte and the expedition continued into the Northern San Luis Valley skirting the La Garita Mountains and the Cochetopa Hills. Upon crossing Poncha Pass they entered the upper valley of the Arkansas in the neighborhood of present Salida. After traveling some distance down the Arkansas Valley they encountered the Comanches whom they were seeking, and inflicted a severe defeat upon them. The region is now known as the Green Horn Mountains, so named for Cuerno Verde, the Comanche chief.¹⁸ After the successful engagement with the Comanches, Anza led his expedition across the Sangre de Cristo Mountains into the San Luis Valley, and continued southward to Taos along the foothills of the Culebra Range.

THE LOUISIANA PURCHASE, PIKE, AND LONG

We have noted previously how the territory of Louisiana was transferred by France to Spain in 1763. For nearly forty years thereafter Spain was in possession of this vast region; but the hopes of France though sleeping were not dead. In the vigorous mind of Napoleon Bonaparte imperial ambitions revived, for his designs not only covered Europe but extended to the New World. Through his influence pressure was brought to bear upon Spain and on October 1, 1800, the secret treaty of San Ildefonso was signed, providing for the retrocession of Louisiana to France.

¹⁸ A. B. Thomas, *op. cit.*, 300.

But not all of Napoleon's schemes prospered. He came to realize that imperial possessions were dependent upon naval power, and under the circumstances considered that his European stakes were of prime importance. The sale of Louisiana to the United States would prevent its falling into the hands of his rival, England, and would at the same time net him cash for immediate uses. He made overtures which finally resulted in a treaty, dated April 2, 1803, whereby the territory was ceded to the United States. The boundaries were left indefinite, the treaty providing for the purchase of "Louisiana with the same extent it now has in the hands of Spain, and that it had when France possessed it; and such as it should be after (according to) the Treaties subsequently entered into between Spain and other powers."¹⁹ When the American ministers attempted to have the boundaries more definitely defined Napoleon made this significant comment: "If an obscurity did not already exist, it would perhaps be good policy to put one there." Jefferson first thought of the territory as including the basins of the Mississippi and the Missouri rivers, but his conception expanded rapidly until it included West Florida, Texas, and the Oregon country.²⁰ Although these latter claims were undoubtedly ill-founded, most of the eastern half of Colorado may fairly be considered as having been acquired by the United States in the Louisiana Purchase. The Purchase as a whole was of vast importance to the young Republic. By one stroke the territory of the nation had been doubled and unmeasured resources acquired.

The broad and many-sided Jefferson had long been interested in the trans-Mississippi country. Various exploration projects had previously received his support, and the famous Lewis and Clark expedition was already projected before the Louisiana country was acquired. With the territory now obtained, the plan was given impetus. In the years 1804-6 the great journey of Lewis and Clark

¹⁹ Treaties, Conventions (Malloy, ed.) I; 508.

²⁰ A good discussion of this question is presented by T. M. Marshall in his *History of the Western Boundary of the Louisiana Purchase, 1819-1841*. This monograph has been followed by the present writer for the substance of the pages on the Louisiana Purchase.

to the mouth of the Columbia and return was accomplished, and a vast fund of information upon the region made available. In the meantime Congress became interested in exploration. The channels of the Arkansas and the Red rivers must be examined, thought the House Committee of Commerce and Manufactures, for these were included in the purchase. In 1804-5 the Dunbar-Hunter expedition explored the Red River as far as the mouth of the Washita and in 1806 the Freeman expedition followed the same stream to the present western boundary of Arkansas, where it was turned back by the Spanish expedition of Malgares. Among these exploring expeditions dispatched during the first decade of the nineteenth century, there was one of transcendent importance to the history of Colorado. This was planned and executed under directions from General James Wilkinson, and was led by a gallant young Captain from the United States Army—Zebulon Montgomery Pike.

On July 15, 1806, Captain Pike with his little party of twenty-two men set sail from Belle Fontaine, a few miles from St. Louis.²¹ His immediate duty was to escort fifty-one Osage and Pawnee Indians to the Osage towns. After proceeding up the Missouri and Osage rivers the Indians were delivered at their villages near the eastern boundary of Kansas. Here horses were procured and on September 1st the party moved westward. By the 25th they had reached the "Pawnee Republic" on the Republican River.²² The day before, they had been joined by a Pawnee who wore a scarlet coat, a Spanish medal and a medal of George Washington. These gave an indication of the various influences that were being brought to bear upon these Indians. At the village definite information was received pertaining to the recent Spanish expedition that had penetrated United States territory to this point. The jealous and ever-watchful Spaniards had learned of the Pike expedition before it left St. Louis. This information was rapidly transmitted to

²¹ In this review of the Pike Expedition I shall follow *An Account of Expeditions to the Sources of the Mississippi and through the Western Parts of Louisiana . . .* by Major Z. M. Pike. Philadelphia, 1810. Hereafter I shall refer to this volume as "Pike's Account."

²² Pike's Account, 141.

Spanish authorities in Mexico and resulted in a counter movement to meet Pike and turn him back. Matters between the United States and Spain bore a rather serious aspect in 1806 and the boundary line between their respective territories was by no means definitely drawn; hence the anxiety of Spain to ward off an aggressive nation.

This Spanish expedition was led by Don Facundo Malgares, a noble who had distinguished himself in expeditions against the Apaches.²³ With a force of six hundred mounted troops and over two thousand horses and mules he sallied forth, equipped for a six months' tour. After descending the Red River over five hundred miles, where a council was held with the Tetaus (Comanches), he turned northeastward to the Arkansas and then came on to the Pawnee Republic. Here another council was held and the Indians were presented with flags and medals. All American traders found at the villages were taken captive by the troops. Some of these were later found by Captain Pike at Natchitoches in abject poverty. The Spanish expedition returned to Santa Fé in October, 1806. Here Malgares remained until Pike was brought in, five months later, and then as an escort conducted Pike to Chihuahua.

The Pawnees attempted to dissuade Pike from going further west. The chief said that he had induced the Spaniards to turn back at this point and had promised to turn the Americans back. He would use force if necessary. Pike replied that he "had been sent out by our great father to explore the western country * * * and that the young warriors of his great American Father were not women to be turned back by words." Considerable anxiety was felt during the next few days and the Americans prepared for the worst. On October 7th they decided to move forward. Pike records: "I had given orders not to fire until within five or six paces, and then to charge with the bayonet and saber, when I believe it would have cost them at least one hundred men to have exterminated us, which would have been necessary."²⁴ Fortunately, opposition did

²³ *Ibid.*, 142. Data upon this counter-expedition is presented by Pike in a footnote.

²⁴ *Ibid.*, 148.

not materialize and Pike was able to continue, without hindrance, his march to the Big Bend of the Arkansas. Here two canoes were made from cottonwood trees and buffalo skins, with which Lieutenant Wilkinson (son of the General) and five soldiers descended the river and returned to the States.²⁵ Captain Pike and the fifteen remaining men followed the trail made by the Spanish troops on their recent excursion, along the south bank of the Arkansas. On November 12th the little party crossed the present state line and entered Colorado territory. Three days later the first view of the Rocky Mountains was had from a point a little below the mouth of the Purgatory River.²⁶

Camp was made at the present site of Rocky Ford on the 17th, and the site of Pueblo was reached November 23d. Since a band of sixty threatening Indians were encountered at the latter place it was determined to put up a little breastwork for defense near the confluence of Fountain Creek with the Arkansas. Meagre as was this little fortress, it was undoubtedly the first defensive structure made by Americans in Colorado.²⁷

Pike decided to leave his men here while he climbed to the summit of the "Highest Peak" to survey the surrounding country. At one o'clock on November 24th he set out with three companions for his mountain climb. The third night thereafter was spent near the top of Cheyenne Moun-

²⁵ The expedition now consisted of the following: Captain Pike, Dr. Robinson, Interpreter Vasquez, Sergeant Meek, Corporal Jackson, Privates Brown, Carter, Dougherty, Gorden, Menaugh, Miller, Mountjoy, Roy, Smith, Sparks and Stoute.—Elliott Coues, *The Expeditions of Zebulon Montgomery Pike*, footnote, p. 432.

²⁶ This stream has been known by a variety of names. To the Spanish it was known as Rio Purgatorio or Las Animas and to the French as Riviere Purgatoire. Pike merely calls it First Fork. An amusing transformation of the French by American frontiersmen has rendered the name "Picket Wire."

²⁷ This breastwork was constructed November 24, 1806. Three sides were built five feet high with logs and the river bank served the purpose of a fourth side. It was located on the south side of the Arkansas, a little above the mouth of Fountain Creek, and within the present limits of the city of Pueblo. It soon disappeared and its exact location cannot be determined.



(From Engraving 1810.)

PIKE'S EXPEDITION INTO COLORADO, 1806-7
(A Portion of Pike's Map)

tain, where they "encamped in a cave, without blankets, victuals or water."

November 27. Arose hungry, dry and extremely sore from the inequality of the rocks on which we had laid all night, but were amply compensated for our toil by the sublimity of the prospect below. The unbounded prairie was overhung with clouds, which appeared like the ocean in a storm, wave piled on wave and foaming, while the sky was perfectly clear where we were. Commenced our march up the mountain and in about one hour arrived at the summit of this chain. Here we found snow middly-deep; no sign of beast or bird inhabiting this region. The thermometer which stood at 9 degrees above zero at the foot of the mountain here fell to 4 degrees below zero. The summit of the Grand Peak which was entirely bare of vegetation and covered with snow, now appeared at the distance of fifteen or sixteen miles from us. It was as high again as what we had ascended, and it would have taken a whole day's march to arrive at its base, when I believe no human being could have ascended to its pinical [pinnacle]. This with the condition of my soldiers, who had only light overalls on, no stockings, and were in every way ill provided to endure the inclemency of the region; the bad prospect of killing anything to subsist on, with the further detention of two or three days which it must occasion, determined us to return.²⁸

The return to the Arkansas was made by way of Turkey Creek and camp was reached on the evening of the 29th. This five-day excursion toward "Highest Peak" was rather unfruitful except in experience. It probably helped, however, to attach Pike's name to this famous Colorado mountain.

On the last day of November, in the midst of a heavy snow storm, Pike and his little party turned westward again, continuing up the Arkansas Valley. December began with a foot of snow and the thermometer at 17° below zero. The men were poorly equipped for such conditions and Pike writes: "I wore myself cotton overalls, for I had not calculated on being out in that inclement season of the year."²⁹ Some buffalo bulls were killed and their hides used for making moccasins. December 4th they camped at the present site of Florence, and the next night reached the mouth of the Royal Gorge. After some explor-

²⁸ Pike's Account, 168.

²⁹ Ibid., 171.

ation about this picturesque region Pike turned northward (most probably up Oil Creek) into the South Park. Here on the South Fork of the South Platte unmistakable signs of extensive Indian camps were seen. They continued about thirty miles through the South Park along this stream and then turned southwest over Trout Creek Pass.³⁰ The river now encountered was thought at first to be the Red River but the error was subsequently discovered. Pike continued up the Arkansas River to the vicinity of Twin Lakes and then retraced his steps. The men had been practically without food for two days but in the Arkansas Valley in the vicinity of Salida buffaloes were encountered and eight were killed. Christmas day was therefore spent in semi-luxury. Although no food was to be had except meat (without salt), this existed in plenty, and the explorers could celebrate with glad hearts. The further course down the Arkansas was very difficult. Sleds were constructed and drawn by the men over the ice. Finally on Pike's birthday, January 5th, the previous camp at the Canon City site was reoccupied. A month had been spent in South Park and at the headwaters of the Arkansas, but the source of the Red River which they sought was many miles away.

Pike was now puzzled as to what to do next. His horses were unable to travel and supplies were meagre. At length he determined to build a blockhouse here for defense and deposit, leave two men in charge of the horses and part of the baggage, and with the rest of the men cross the mountains on foot in search of the Red River.³¹ In con-

³⁰ Pike's map indicates a journey to the headwaters of a stream which he calls the Yellowstone River, but the journal gives no such itinerary. It is likely that Pike saw other affluents of the South Platte to the north which he mistakenly presumed to be the headwaters of the Yellowstone. The map might be interpreted as indicating a visit to the headwaters of the Blue River branch of the Colorado River, but as the journal gives no account of crossing the intervening range, such a visit is very improbable.

³¹ The exact site of this block house cannot now be determined. It is almost certainly within the present limits of Canon City. Pike's interpreter, A. F. ("Baroney") Vasquez and Patrick Smith were the two men left here. They probably fared better than the men who continued with Pike. This movement by Pike in the dead of winter

formity with this plan the march was resumed on the 14th, Grape Creek being followed to the southward. Although the packs for each man averaged seventy pounds, good progress was made during the first days.

As they ascended Grape Creek the snow became deeper but gradual progress was made. On the 24th they crossed the divide to the headwaters of the Huerfano. Fortunately, buffaloes were found and meat was secured. A passage of the Sangre de Cristo range was now effected over Sand Hill Pass,³² and the great level San Luis Valley spread out before the little party. To the west was another snow-covered range and on the floor of the intervening valley the winding thread of the Rio Grande was discernible. Toward this stream they now turned, taking a southwest-ern direction which brought them to its banks in the vicinity of present Alamosa. Their plan was to follow down this stream until timber was found with which to make transports for descending the river. A favorable location was found five miles up the Conejos branch and here camp was made. Some of the men were immediately set to work

appears unnecessary and perhaps foolhardy. If he were really seeking for the Red River—and his purpose is doubtful—he could better have gone down the Arkansas some distance and then have skirted the eastern foothills of the range rather than try to penetrate the mountains at this season.

A. F. Vasquez was the fifth child in a French family of twelve (Records of the Old Cathedral Church Register, St. Louis, Missouri). His brother, Louis, was a fur trader in Colorado in the thirties. A. Pike Vasquez, a business man in Denver in 1860, was a son of Pike's interpreter, and received his name in honor of the Captain his father accompanied in 1806-7.

³² My conclusions (worked out independently from the original journal before consulting Coues) agree with those of Elliott Coues (p. 491) as to the course of Pike in crossing the Sangre de Cristo mountains through Sand Hill Pass. This pass agrees best with the distances given and with Pike's map. It also would bring the explorer out upon the lower reaches of the famous sand dunes which Pike noted. Sand Hill Pass is also called Medano Pass and was called Music Pass by Hayden and William's Pass by Gunnison and Beckwith. Its position in reference to Mosca or Robidoux Pass and to Sangre de Cristo Pass is shown in my "Map of Historic Forts, Trails, and Battlegrounds of Colorado", published in *Municipal Facts*, May, 1925.

(February 1st) building a fort that could be used to house the men. This was the most pretentious building erected in Colorado up to this time. It was made of cottonwood logs and was thirty-six feet square and twelve feet high. Sharpened pickets projected over the walls. A ditch four feet wide was dug around the fort and filled with water. Portholes were made eight feet from the ground and a platform was provided from which to shoot.³³ On the 7th Dr. Robinson, a civilian who had accompanied the expedition, set out alone for Santa Fé. The pretended object of his journey was to collect from a person in New Mexico certain debts that were due a citizen of the United States. The real purpose, however, was undoubtedly to enter New Mexico under cover of such a legitimate mission, and then obtain as much information as possible regarding the resources of the country and the conditions there.³⁴ The mission of Doctor Robinson brings up the whole question of the real purpose of the Pike expedition—a problem somewhat involved in mystery.

It will be remembered that Pike was on the Spanish frontier under instructions from General Wilkinson; and it is common knowledge that this General was for a time playing a prominent part in the traitorous design of Aaron Burr in the Southwest. Pike's open instructions were to "approximate" to the Spanish settlements and spy out the land geographically and politically. Nothing has come to light which would conclusively prove that he had further private instructions or that he was aware of the traitorous designs of Wilkinson and of Burr.³⁵ He must have real-

³³ Pike's Account, 194.

³⁴ Subsequent events furnish further proof that Robinson was in reality a spy. When Pike again met Robinson in New Mexico he was so fearful of the latter's personal safety that he pretended not to know him and denied point-blank to the Spanish authorities that Robinson was one of his party. This departure from his usual code of ethics his conscience perhaps condoned in behalf of a friend's security and on grounds of patriotism.

³⁵ Jerome C. Smiley has made a rather exhaustive study of this question and presents his argument and conclusions in his *Semi-Centennial History of Colorado*, chapter 4. His conclusion is that Pike's expedition was an integral part of the Burr-Wilkinson design for an empire in the Southwest. He is convinced also, that

ized that he was in Spanish territory, but the boundary line had not yet been definitely drawn. Also, the Malgares expedition had penetrated well into United States territory only the year before; why then should Pike be punctilious about boundary lines?

Nine days after the departure of Doctor Robinson two horsemen were seen some distance from the fort. They finally came in and informed Pike that Robinson had reached Santa Fé four days before and was well received.

On February 26th one hundred Spanish troops came upon the scene. Captain Pike was politely invited to come to Santa Fé. Being convinced that the troops came with orders to fetch him, and being informed that he was an intruder upon Spanish soil, Pike concluded that it was the part of prudence to accept the invitation as if made in good faith and accompany the troops.³⁶ However, it was with a feeling akin to regret that the Americans vacated their excellent little fortress without having tested its strength, and turned their faces toward Santa Fé.³⁷ The famous little American party with its gallant captain now left the territory of our state and vacated the fort from which the American flag had fluttered in the breezes of the Rockies. The further progress of the party does not primarily concern us here. Suffice it to say that from Santa Fé they were conducted to Chihuahua and ultimately were released upon

Captain Pike was cognizant of this relation, and party to it. The expedition was sent out by General Wilkinson without the knowledge or authorization of President Jefferson or of the Secretary of War. Space will not permit us here to enter into an exhaustive analysis of this problem but the present writer is convinced that there is sufficient evidence to connect the expedition undeniably with Wilkinson's traitorous schemes. That Captain Pike was party to the plot is more doubtful, but there is evidence that points in that direction. In the absence of more conclusive proof, however, it may be unfair to reflect upon the character and integrity of the Captain.

³⁶ When Pike was told that he was not on the Red River he affected surprise and ordered his flag lowered. Pike may have raised the flag over the temporary structures built at the sites of Pueblo and Canon City, but this fort on the Conejos is the first post in Colorado over which we are positive that the flag floated at so early a date.

³⁷ Pike left two of his men at the fort in company with some of the Spanish troops to await the return of the men from the Arkansas and then to conduct them to Santa Fé.

the Louisiana border to return home.³⁸ During his sojourn in New Mexico Pike was forced to surrender his notes and papers,³⁹ but, being ever alert for information, he was able upon his return to the United States, to give a valuable description of Spanish possessions in the Southwest and rewrite an account of his journey thither.

Pike's account of the expedition was published in 1810, was read eagerly by the general public, and ran into several foreign editions.⁴⁰ The information given had an important effect in inaugurating and promoting trade with the Southwest, and in the establishment of the Santa Fé Trail. Although Captain Pike was not the first American on Colorado soil,⁴¹ he was the first to explore rather thoroughly a section of our territory and publish a description of the country. The land was in the somber garb of winter when seen by the explorer, but his report was not repellent; in fact, his description of the San Luis Valley was very favorable, almost in the spirit of the promoter.

More than a decade elapsed before another official explorer penetrated Colorado. Then a Major of the United States Topographical Engineers approached by a different route, one that was later to become the principal emigrant route to Colorado.

Major Long and his nineteen men set out from Engineer Cantonment (near present Omaha) on June 6, 1820.

³⁸ They reached Santa Fé March 3, 1807; Chihuahua April 2d; and were released at Natchitoches on July 1st.

³⁹ The original papers of Captain Pike were discovered by Prof. H. E. Bolton in the archives of Mexico (See *American Historical Review*, XIII: 798). No scholarly monograph upon Pike has appeared since that time and the work of Elliott Coues remains the most thorough treatment of the subject. New light upon a number of points would doubtless reward a careful study of the original papers. It is to be hoped that some scholar will make these available to the general public.

⁴⁰ An English edition was published at London in 1811; a French edition at Paris in 1812; a Dutch edition at Amsterdam in 1812-13; and a German edition at Weimar in 1813. A copy of each of these editions is in the E. B. Morgan collection of the State Historical and Natural History Society of Colorado.

⁴¹ Captain Pike speaks of James Pursley [Purcell] as "the first American who ever penetrated the immense wilds of Louisiana toward the west." See below.

Among the men were a zoologist, a botanist, a naturalist, and a landscape painter. Twenty-eight horses and mules were provided to carry the provisions.⁴²

A westward course brought the party to the three Pawnee villages on the Loup Fork in east central Nebraska. Here about 5000 Pawnees resided; and around the villages some six or eight thousand horses were grazing. Fields of corn, beans, and pumpkins were being tended by the squaws. Two French Canadians living with the Pawnees, Bijeau and Ledoux, were induced to accompany the expedition as guides and interpreters. Bijeau had been repeatedly at the head waters of the Platte and the Arkansas and was a very valuable addition to the party.⁴³

From these villages the expedition turned southward to the Platte, and followed along the north bank of this broad and shallow stream. The marches were rather regular, about twenty-five miles being covered each day. On June 22nd they arrived at the confluence of the north and south forks of the Platte. Large herds of buffaloes were now encountered, their dusky bodies blackening the whole surface of the prairie, while the dust pawed up by veteran bulls dotted the landscape with jets of white. Thousands upon thousands of these bison surrounded the explorers.

The present state line was crossed on June 27th and entrance to Colorado was made near the site of Julesburg. The next day several bands of wild horses were seen. Americans were just entering Colorado, but Spaniards had been in the West for three centuries, and the horse, transplanted to the New World, had thrived until now it was to be seen running wild upon the plains. The Rocky Mountains came into view on the morning of June 30th. Toward evening the air became clearer and the view of the mountains more distinct. "We soon remarked a particular part of the range divided into three conic summits each apparently of nearly equal altitude." This we concluded to be the point designated by Pike as the 'Highest Peak.' "⁴⁴

⁴² Edwin James, Account of Long's Expedition, I, 425.

⁴³ Ibid., I, 450.

⁴⁴ This appears on James' map as "Highest Peak," but would not be the "Highest Peak" of Pike's map.

In this, Long was of course mistaken, for Pike's "Highest Peak" was many miles to the southward. But the outstanding peak viewed by Major Long was no other than the jagged prominence that now bears his name.

On July 3rd they passed the mouths of three large creeks heading in the mountains, the Cache la Poudre, Thompson's, and St. Vrain's. They traveled during the forenoon of July 4th and camped in the vicinity of Brighton where they remained in camp during the afternoon and celebrated the day by the distribution of an extra pint of maize to each mess, and a small portion of whiskey. On July 5th they ascended the Platte and encamped near the present northern outskirts of Denver. From here, they continued on up the river to the mouth of Platte Canyon.⁴⁵

The men were delighted with having at last reached the famous mountains, and eagerly began the exploration of the first range. A number of the party clambered over rocks and cliffs for about ten miles and reached a point from which they could see the branching of the Platte into its two principal forks. Here they were rewarded with a magnificent view from the summit of one of the high hills. "To the east over the tops of the few inferior elevations, lay expanded, like an ocean, the vast interminable prairie, over which we had so long held our monotonous march. The undulations which vary its surface now disappeared and the whole lay like a map before the observer. They could trace the course of the Platte and number the streams they had crossed * * * by the slight fringing of timber or bushes which margined their banks, and by an occasional glimpse of their streams, shining like quicksilver, and interrupting and varying the continuity of the plains as they pursued their serpentine course."⁴⁶

The explorers' southward course was now taken along Plum Creek, to which they gave the name "Defile Creek."

⁴⁵ Dr. James' account of the streams crossed in the vicinity of Denver does not conform with the map that accompanies the journal and neither the map nor the account conform with the actual physical features. There seems little doubt, however, that "Cannon Ball Creek" is our present Clear Creek, that "Medicine Lodge Creek" is our Bear Creek, and that "Vermillion Creek" is our Cherry Creek.

⁴⁶ James' Account of Long's Expedition, II, 9.

Beavers were plentiful in this stream and their numerous dams had converted the creek into a succession of beautiful ponds. The Divide was crossed on the 11th,⁴⁷ and the descent towards the Arkansas River was begun. A buffalo trail was followed to and along Fountain Creek and in the evening they found themselves a little to the southeast of Pike's Peak. This already-famous mountain had appeared on various maps as the "Highest Peak," and it was now decided to attempt to reach its summit.

Before the sun had emerged from the plains on the morning of July 13th, Doctor James and two companions started for the summit of Pike's Peak, going by way of the famous "Boiling Spring" of Manitou. Each man carried a "small blanket, ten or twelve pounds of bison meat, three gills of parched corn meal, and a small kettle." The guide assured them that many attempts had been made by hunters and Indians to ascend the peak but none had been successful because of the loose sand and gravel upon its sides. An uneasy night was spent on the side of the mountain. No level place could be found and the adventurers placed a pole between two trees to keep themselves from rolling down the steep incline. With the break of day the climbing was resumed. Through a grove of quaking aspen and along a ridge covered with pine and cedar they struggled skyward. At length they reached the fascinating timberline, where dwarfed evergreens maintain a constant struggle against the wintry blast with its bombardment of cutting stones or icy snow. Above them still loomed the almost naked mountain in its scant summer garb of brilliant alpine flowers. The further ascent was interrupted by short stops to gather specimens of the rare flora that here live an ephemeral life. Lunch was eaten at two o'clock and after a further climb of two hours the goal was reached. It was the 14th of July, 1820, and for the first time in the ages a white man's shadow was cast on the summit of "America's

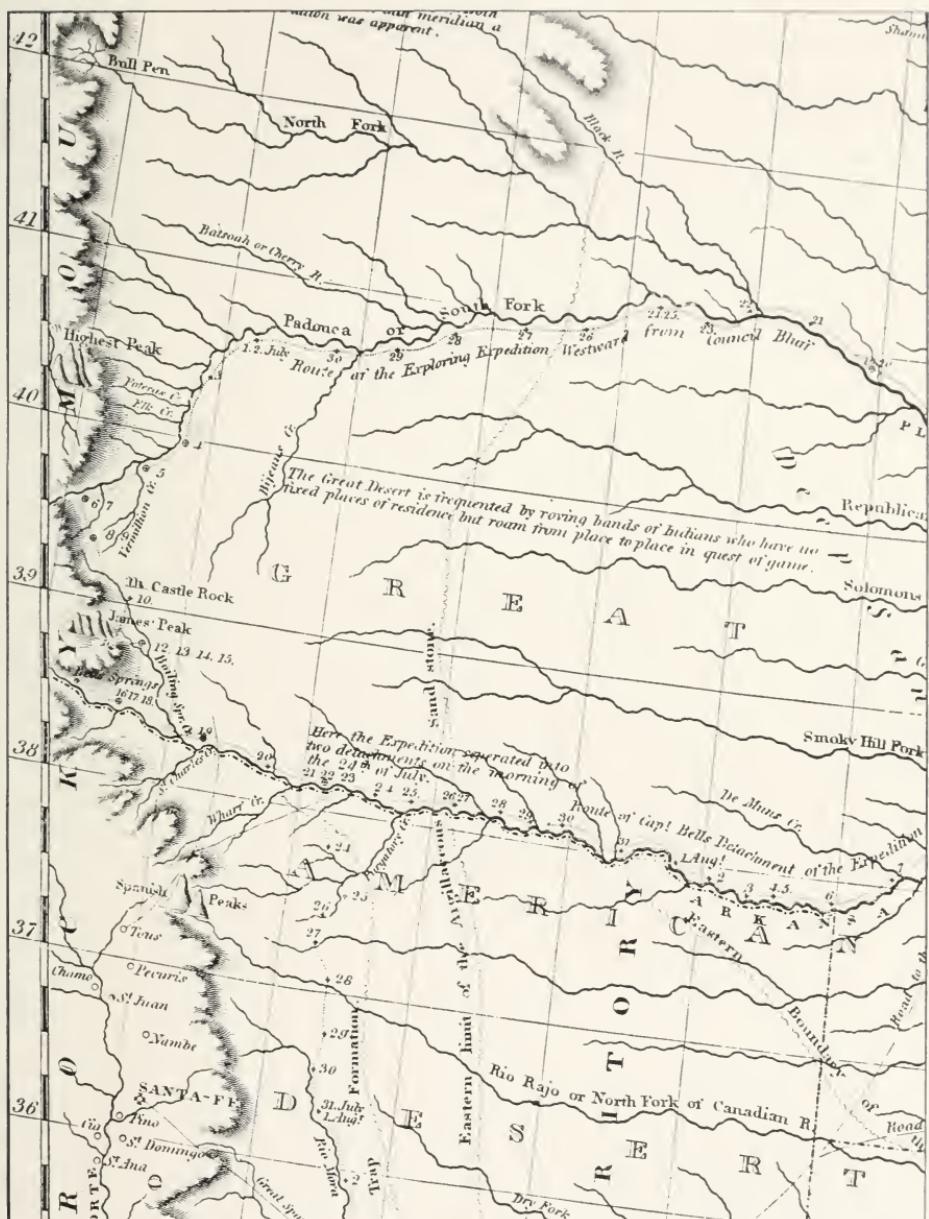
⁴⁷ No entry is made for July 10th and the travels of the 9th and 10th are evidently merged. The account and also the map are very poorly done here. Upon the map Fountain Creek is drawn too far to the north while Plum Creek is shortened. The camp of July 10th appears on the map well down on Fountain Creek whereas the journal has the party cross the Divide on the 11th.

most famous mountain:" Wonderful and awe-inspiring was the view before them. To the west lay the narrow valley of the Arkansas, and beyond, pile on pile of snow-capped mountains extended to the horizon. A large, woodless park extended miles to the northward and within it, far in the distance a thin line of smoke indicated the location of an Indian hunting party. "To the east lay the great plain, rising as it receded, until, in the distant horizon, it appeared to mingle with the sky."

After a short stay at the summit the descent was begun, and by noon of the following day they had reached the Boiling Spring. In the bottom of the spring great numbers of beads and Indian ornaments were found—offerings to the Great Spirit. The French guide, Bijeau, said that he had repeatedly taken beads from the springs and sold them to the same natives who had thrown them in. Major Long named the mountain "James Peak," but the trappers who later frequented the region called it "Pike's Peak," and this name persisted. James' name was later given to a peak farther north, under which the Moffat tunnel is being bored.

On July 16th the party moved from their camp on Fountain Creek and after a ride of twenty-eight miles arrived upon the Arkansas. The next day Captain Bell, Doctor James and two others started up the Arkansas toward the mountains. They followed up the valley to the Royal Gorge and named the springs at the mouth of this canyon "Bell's Springs," in honor of the Captain. They did not try to penetrate farther but returned to the main body on the 18th. Since supplies were nearly exhausted, it was decided to begin the homeward journey. They moved down the valley of the Arkansas, passing the mouth of the St. Charles River (Pike's Third Fork) on the 19th, and were opposite the mouth of the Huerfano (Orphan) next day. The guide informed them that the Spanish called the stream "Wharf Creek," and James concluded that this was because the stream had precipitous banks about the height of a wharf. This is one of the interesting corruptions of place names in Colorado which fortunately has not persisted.

About eighteen miles above the Purgatory the party divided, Captain Bell and eleven men continuing down the



THE "GREAT AMERICAN DESERT"

(Map accompanying the report of the Major Long Expedition of 1820)

Arkansas, while Major Long and nine others turned southward for the Red River. After striking the Purgatory and following it some distance, Major Long followed Chaquaqua Creek to its source. They were now on the open plateau country of the Mesa de Maya. A southward course was taken and the explorers made their exit from the territory of our state July 27th, just a month from the time they had entered it. The entrance into New Mexico was doubtless through Emery Gap, where the Colorado and Southern Railroad now passes. After crossing the headwaters of the Cimarron a southern course took them to Ute Creek, which was followed to the Canadian.⁴⁸ Down this stream thought by them to be the Red River, the party made its way back to the frontier. In the meantime the party under Captain Bell had continued down the Arkansas and reached Fort Smith without important incident.

The general conclusions and observations of Major Long are of interest today in view of the unexpected development of the region he traversed. Major Long wrote:

"In regard to this extensive section of country between the Missouri River and the Rocky Mountains we do not hesitate in giving the opinion that it is almost wholly unfit for cultivation, and of course uninhabitable by a people depending upon agriculture for their subsistence. * * * This region, however, viewed as a frontier, may prove of infinite importance to the United States, inasmuch as it is calculated to serve as a barrier to prevent too great an extension of our population westward, and secure us against the machinations or incursions of an enemy, that might otherwise be disposed to annoy us in that quarter."⁴⁹

Doctor James' impressions of the country were similar to those of Major Long. He speaks of the region along the Platte as "presenting the aspect of hopeless and irre-

⁴⁸ Tramperos, or Major Long's Creek, has heretofore been considered as the stream which was followed to the Canadian. A. W. Thompson, of Clayton, New Mexico, has recently made a study of the route and has gone over the ground covered. His data leaves little doubt that Ute Creek is the stream followed. On Long's map the stream is called "Rio Mora," but the present stream of this name is too far west to have been encountered.

⁴⁹ James' Account of Long's Expedition, II. 361.

claimable sterility.”⁵⁰ Such reports of this western country fell unwelcomed upon the ears of an expansive people, eager to possess what was thought to be an empire. On the other hand it was welcomed by certain eastern men who were hostile to western expansion. Long’s report has been criticized as being unfairly derogatory to the country visited, but it is too much to have expected him to foresee the wonders that would result from the railroad, the irrigation ditch and scientific dry-farming. Upon his map Doctor James labeled the region of the great plains between the Platte and the Canadian rivers, the “Great American Desert.” This designation was carried over into the maps and school books of the country and for half a century persisted in the minds of the people. In later years, however, the abundant crops which sprang from the prairie dispelled forever the false impression and the inappropriate appellation, the “Great American Desert.”

TRAPPERS AND THE FUR TRADE

We have seen in the previous section how, during the first two decades of the nineteenth century, the Louisiana territory was acquired by the United States and two official expeditions dispatched into what is now Colorado. But these government explorers were not the only Americans who visited our territory during these early decades. The fur trade that had engaged Frenchmen and Englishmen for two centuries now beckoned to the Americans. Territory to the north of Colorado had heretofore been exploited but now the Southwest and Central West were being revealed as good fur areas.

The first American in Colorado of whom we have record was James Purcell.⁵¹ Captain Pike is authority for the

⁵⁰ *Ibid.*, I, 459.

⁵¹ H. M. Chittenden in his *American Fur Trade of the Far West*, II, 492, renders the name James Purcell, although Pike in his *Account* gives it as Pursley. The *Missouri Intelligencer* of April 10, 1824, contains an article upon the Navajo Indians, written by James Purcell, “for 19 years a citizen of New Mexico,” and who had lately returned from Santa Fé. This doubtless was the man of whom Pike wrote.

information we have regarding this early wayfarer.⁵² Purcell was from Kentucky and had left that region in 1799. In 1802 he went west from St. Louis into what was then foreign territory, upon a hunting expedition. Subsequently he went up the Missouri River and then turned south. While trading with the Paducas (Comanches) and "Kyaways" he, together with these Indians, was driven from the plains by the Sioux, and took refuge in South Park. From this region Purcell was sent in 1805 as an emissary of the Indians to New Mexico to solicit trade. The mission was successful and the American remained in Santa Fé. Here he was pursuing his trade as carpenter when Pike met him and learned his story. He told Pike that he had found gold on the head of the Platte and had carried some about in his shot pouch for months, but had finally thrown it away since he despaired of ever again seeing the civilized world. This story, which we have no good reason to doubt, would mark Purcell as the pioneer American prospector in Colorado as well as the pioneer trapper. However, the gold discovery had no immediate results, for it was not until fifty years after Pike's publication of this story that the great placer gold deposits of the South Park gave forth their treasure.

While Purcell was sojourning with the 2,000 Indians in South Park another American entered Colorado territory. Baptiste La Lande had been entrusted with a stock of goods for the Indian trade by William Morrison, a merchant of Kaskaskia. He was directed to go up the Missouri and Platte rivers and instructed to reach Santa Fé if possible. The mission succeeded, but the ample profits of the enterprise were converted by the unfaithful agent to his own private use.⁵³ The route of La Lande through Colorado was most probably along the South Platte, southward over the Divide to the Arkansas, and thence to Santa Fé via the Raton or the Sangre de Cristo Pass.

Perhaps the next Americans to enter Colorado were a party of trappers led by Ezekiel Williams of Missouri. Williams had ascended the Missouri River in 1809 and for

⁵² Pike's *Account*, Appendix to Part III, page 16.

⁵³ Pike's *Account*, 195.

two years had trapped in that region for the Missouri Fur Company. In the summer of 1811, with nineteen other independent trappers, he turned southward from the upper Missouri country and in two months had reached the Arkansas River in Colorado. Here the winter was spent, and with the spring he pushed into the Colorado Rockies in search of beaver. On the headwaters of the Platte the party separated, eight or ten crossing the mountains westward, while Williams and the remainder of the party turned east and south to the Arkansas. This latter party again divided, four going to Santa Fé, while Williams and five companions remained in Colorado to hunt. Three of the six were presently killed and the survivors sought protection among the Arapahoes, spending a wretched winter (1812-13) with them. Williams determined to attempt escape. He made a canoe, cached his furs, bade his companions adieu, and on March 1, 1813, pointed his little boat down the river. Down the Arkansas he paddled and floated, stopping occasionally to trap beaver and hunt game. In June he was captured by the Kansas Indians and held prisoner for nearly two months; but upon being freed continued his journey and reached his home at Boone's Lick on September 1st. The next spring (1814) Williams joined Phillebert's company and set out for the mountains to recover the cached furs. This party of twenty-one men reached the Arapaho village on the Arkansas, only to learn that the two men left by Williams the previous year had been murdered by the Indians. However, Williams uncached his own furs and with two of the men succeeded in transporting them back to the States.⁵⁴ Phillebert and his sixteen men remained trapping and hunting in the Colorado territory, where we shall hear of them presently.

In 1812 a party of twelve men, led by Robert McKnight,

⁵⁴ There has been much dispute relative to the adventures of Ezekiel Williams. His experiences were made the basis of *The Lost Trappers* by David H. Coyner. Chittenden speaks of Coyner as "chiefly a coiner of lies," which is undoubtedly true of much of the narrative of the book. Williams, however, was no fictitious character, and the data given above are portions of his life story that are well authenticated. See Chittenden, II, 651; also Missouri Historical Society *Collections*, IV, 203.

set out from the United States in an attempt to open trade with the New Mexicans.⁵⁵ They were encouraged to this effort by the outbreak of the war for Mexican independence in 1810. The patriot, Hidalgo, had at first been successful and Americans were hopeful that the old restrictive policy of Spain would be replaced by one more liberal and enlightened. The route of these hopeful traders was doubtless along the Arkansas River and through Southern Colorado to Santa Fé. Arriving at their destination, disappointment and disaster awaited them. The revolution had met reverses, the royalists were in control, and the isolation policy of Spain was still intact. The Americans were seized as intruders and placed in prison. Here they were held for nine long years, until Mexican independence was finally achieved under Iturbide. This expedition through Colorado in 1812 had no immediate effect upon Colorado, but it was the precursor of the Santa Fé Trail that became so important in the later development of this region.

In the summer of 1811 Astor's overland fur trade expedition left the Missouri frontier for the Columbia River along a route that took them to the north of Colorado. At Fort Henry, on the Snake River, a party of trappers was detached from the main body in October. This little group, consisting of Joseph Miller and four companions,⁵⁶ turned south and then eastward until they were probably in Colorado territory. After a successful hunt they were robbed by a band of Arapahoes. The winter was passed under trying conditions and the fur accumulations of the next spring were again lost to the Indians. They were now reduced to abject want, and were working their way toward the Columbia when found by Robert Stuart and a little party returning from Astoria with dispatches for St. Louis and New York.

The earliest large fur trade venture into Colorado territory was launched in 1815 by A. P. Chouteau and Julius De Munn of St. Louis. In September of this year they left the Missouri, in company with Phillebert, for the upper Arkansas country. Phillebert, as we have seen above, had

⁵⁵ *American State Papers*, "Foreign Relations," Vol. IV, 208.

⁵⁶ Chittenden, op. cit., I, 191.

conducted a party into that region the season before and was now returning to his men with supplies of goods. On the way to the mountains, Chouteau and De Munn purchased Phillebert's entire outfit and the services of his men. Phillebert had appointed the rendezvous for his men at the mouth of Huerfano Creek, but upon reaching this point no white men were to be seen, and Indians informed him that his men, becoming short of supplies, had gone into Taos. There the men were found, and at Santa Fé, De Munn sought permission to trap on the headwaters of the Rio Grande, where beaver were known to abound. The local governor had no authority to grant such a request but he promised to recommend favorable action by his superiors. The American trappers now accompanied De Munn back to Chouteau's camp on the Huerfano. Late in February, 1816, De Munn with Phillebert and one other man set out for St. Louis for additional supplies and equipment. Chouteau remained with the men in Colorado, superintending the trapping operations through the spring. When the fur season ended and summer approached they went back to the States with the season's catch of furs.

Chouteau and De Munn met at the mouth of the Kansas River, gathered a party of forty-five men, and again set out for the mountains. Upon reaching the Sangre de Cristo Mountains, De Munn returned to Santa Fé to learn the result of his negotiations of the previous year for trapping privileges in Spanish territory. Disappointment awaited him; the former governor had been replaced, and De Munn was ordered out of the Spanish dominions. After returning to his companions beyond the mountains the united party moved northward to the upper waters of the Arkansas and the Platte, where the fall and winter (1816-17) were spent in trapping operations.⁵⁷ Little data regarding these operations has been preserved. However, Bijeau, the guide for Major Long in 1820, was in the party and he gave some information that is preserved in James' account of the Long expedition.⁵⁸ A little south of Denver, on what was called Grand Camp Creek, a large number

⁵⁷ *Ibid.*, II, 497.

⁵⁸ James' Account of Long's Expedition, I, 502.

of Indians were encamped with the forty-five hunters and trappers. Three nations were represented—Kiowas, Arapahoes, and "Kaskaia." Here they held a trading council with a band of "Shiennes" (Cheyennes). This tribe had recently been supplied with goods from British traders on the upper Missouri, and had come to exchange them for horses. This gives some idea of the methods employed by these early American fur gatherers. Not only did they hunt and trap themselves, but through trade with the Indians obtained large quantities of furs.

De Munn now made a third attempt to gain permission to trap in Spanish territory, but he met with an even sterner rebuff. A company of 200 armed men escorted him to the north bank of the Arkansas. It was decided in the spring of 1817 to turn northwestward for the Columbia, but upon trying to penetrate the Colorado Rockies so much snow was encountered that the project was abandoned. We do not know the paths followed by these trappers of 1815-17 but they must have threaded most of the mountain streams of the region. The beautiful mountain parks of Colorado were visited, for Bijeau was able to describe them to Major Long in 1820.

The prosperous trading venture of Chouteau and De Munn was brought to a rather sudden termination. The bundles of furs had been assembled at the mouth of the Huerfano and all was in readiness for De Munn's return to the States with the season's catch, when the dust from Spanish troops rose on the Taos trail to the south of the Arkansas. The delay in starting had proved fatal. The whole party was taken to Santa Fé and all the furs and property of the traders confiscated.⁵⁹ After forty-eight days' imprisonment they were tried and sentenced to leave Spanish territory, forfeiting all property except one horse each. This treatment was poor reward for the months of work and the dangers encountered. News of such treatment had a deterrent effect upon others who might have

⁵⁹ A claim was made for the losses sustained, but was not paid for over thirty years—long after Chouteau's death.—Foreman, *Pioneer Days in the Early Southwest*, 79. Much other data upon Chouteau is given by Foreman.

turned westward to exploit the fur resources of our territory on the borders of New Spain. With the achievement of Mexican independence in 1821, however, the restrictive policy of Spain was removed, and favorable trade relations were opened with New Mexico.

One of the most important early private ventures into Colorado was the Glenn-Fowler expedition of 1821-2. Though perhaps not so large nor important as the Chouteau-De Munn enterprise, it has a more definite place in history because of the data preserved in *The Journal of Jacob Fowler*.⁶⁰ It also gives us the first known description of certain parts of Colorado. "Major" Jacob Fowler, of Kentucky, and "Colonel" Hugh Glenn, of Ohio, led a party of twenty men on a trapping expedition to the Rocky Mountains. They left Glenn's trading post, on the Arkansas, near the mouth of the Verdigris, on September 21, 1821, and after following the general course of the Arkansas River reached the present boundary of Colorado on November 5th. In the latter part of November an Indian camp was reached, situated on the north side of the Arkansas a little northwest of the present town of Fowler. Here "Major" Fowler built a temporary log house. There were 900 Indian lodges in the neighborhood, and Fowler estimates that 1,000 of the naked, robust papooses were to be seen at one time running and sliding upon the ice of the river. The Indian hunters furnished the American trappers with buffalo meat but would not let the white men hunt for themselves, fearing that they might drive the "Indians' cattle" away.

Late in December a party of sixty Mexicans came to the Indian camp to trade, and the Americans were able to procure corn from them to vary their meat diet. The Mexicans seemed very friendly, and "Colonel" Glenn took four of his party and set out with them for Santa Fé. The day after their departure Fowler and the remaining men began building a house and a horse pen on the south side of the river a mile or two below the mouth of Fountain

⁶⁰ This journal was ably edited by Elliott Coues, and was printed (1898) with the unique orthography of the trapper-journalist faithfully preserved.

Creek. When the house was nine logs high a tent was placed on top for a roof and these early residents of Colorado moved in. Trapping was attempted on Fountain Creek but met with indifferent success. When the 15th of January came and Glenn had not yet returned the men on the Arkansas began to fear possible treachery. In view of this they decided to move across the river onto American soil. Accordingly, a three-room house was built upon the present site of Pueblo in the middle of January, 1822. These log houses built by the Fowler party were perhaps the earliest of such structures built by private citizens in Colorado. The anxiety was relieved on January 28th, when one of Glenn's men and some Mexicans rode into camp and reported a receptive spirit on the part of authorities at Santa Fé. Preparations were immediately made for a movement into New Mexico. The Spanish road along the San Carlos and Greenhorn was followed to the upper waters of the Huerfano. The trail over the mountains was by way of the Sangre de Cristo Pass. In the San Luis Valley the Culebra and the Costilla creeks were passed as the party continued on to Taos. This "Taos Trail" was already well known to the New Mexicans, but the Glenn-Fowler expedition was the first American party to traverse it and leave us their itinerary.

On February 12th Fowler and four men set out from Taos for a trapping expedition into the San Luis Valley. They crossed the Rio Grande and turned northward, reaching the Conejos after a week's travel. Beaver were found here and Fowler continued up the Rio Grande to its South Fork, trapping with fair success as he proceeded. In April he went back down the river, turned eastward, trapped on the Trinchera, and then returned to Taos. With the winter trapping over, they decided to return with their furs to the United States. Robert McKnight and his companions, freed from their long imprisonment, accompanied the Fowler party.⁶¹ A new road was broken through Colorado

⁶¹ Thomas James led a party to Santa Fe in 1821 by a route south of the Arkansas. With him went John McKnight to rescue his brother Robert from prison. See W. B. Douglas, ed. *Three Years Among the Indians and Mexicans* by General Thomas James. The

by these returning Americans. After going northeastward from Taos they struck the headwaters of Chaquaqua Creek and traveled around the Mesa de Maya. Continuing northeastward, they passed the Two Buttes and followed Butte Creek most of the way to the Arkansas, whence they followed the familiar trail back to the States.

James Ohio Pattie was an adventurous youth who during the middle '20s threaded Colorado from every direction of the compass. Young Pattie and his father had joined a party of traders headed for Santa Fé in 1824. This caravan consisted of 116 men, the major part of whom were in the employ of Bernard Pratte, a merchant of St. Louis.⁶² Leaving Council Bluffs late in July, the party went by way of the Pawnee villages and entered Colorado along the Smoky Hill branch of the Kansas River. This is the earliest account we have of an American expedition taking a course which in part at least followed what later became famous as the Smoky Hill Route. The Arkansas River was reached in September and a trail taken which brought them to Taos the following month. At Santa Fé permission was obtained to trap on the Gila River, and the Patties turned westward to that field. The furs obtained were stolen by Indians and the elder Pattie leased a copper mine and changed occupation. But young James grew restless and longed for uncharted paths and the adventures of the hunt. In company with a party of French trappers he turned again toward the Gila in January, 1826. After following this stream to the Colorado River the few who survived a treacherous Indian attack turned northeastward up the river, skirting the Grand Canyon its entire length.

From the mouth of the San Juan, on April 25th they continued up the Colorado River, probably to its source. Pattie's narrative is so brief and general that it is impossible to determine the pass by which he crossed the Continental Divide. His description of the crossing, however,

James and McKnight parties accompanied the Glenn-Fowler party back to the States.

⁶² Thwaites, *Early Western Travels*, XVIII, 11. Thwaites has reprinted *The Personal Narrative of James O. Pattie* with some helpful notes.

is rather graphic: "The passage occupied six days, during which we had to pass along compact drifts of snow higher than a man on horseback. The narrow path through these drifts is made by the frequent passing of buffaloes, of which we found many dead bodies in the way. We had to pack cottonwood bark on the horses for their own eating, and the wood necessary to make fires for our cooking. Nothing is to be seen among these mountains but bare peaks and perpetual snow."⁶³ Shortly after crossing the divide they "struck the south fork of the Platte near Long's Peak and descended it five days."⁶⁴ Beavers now became scarce so the party turned north to the Big Horn. After this northward excursion they returned to Colorado territory and moved southward to the Arkansas. Following this stream to its upper waters, they crossed the mountains to the south and struck the Rio Grande, which they followed into New Mexico. The large catch of furs was brought into Santa Fé August 1st, but was immediately confiscated by the governor. The thousands of miles of marching, the fatiguing labor, and the dangers encountered were thus robbed of their legitimate fruits by this irresponsible official.

The subsequent wanderings of this adventurous youth into Sonora, Texas, and ultimately into California are interesting and instructive but cannot be traced here. Remarkable as was the extent of his wanderings, they were not unique. Other trappers were following the streams and crossing the mountain passes on journeys fully as long and hazardous as those of Pattie. For many of these, the trails beckoned on and on, and the journey ended only when some grizzly caught the hunter unprepared or a skulking Indian sent the deadly missile from ambush. Such journeys were never recorded nor ever can be, but the adventurers who made them were the real pathfinders and pioneers of Colorado and of the West.

During the early '20s numerous fur traders entered Colorado territory. Those were the days when beaver

⁶³ *Ibid.*, 140.

⁶⁴ *Ibid.*, 140. Thwaites thinks they crossed at South Pass, but the journal seems to indicate a passage in the vicinity of Boulder Pass.

skins were money, and the Rocky Mountain region was a rich field for obtaining packs of such currency. This commodity constituted an important item of traffic over the Santa Fé trail. Many of these early traders turned northward into Colorado and spent months or years in trapping the streams that reach up to the perpetual fountains of snow on the granite mountains. William Becknell, father of the Santa Fé trade, had a party of trappers on our Western Slope in 1824.⁶⁵ During the same year William Huddart and fourteen men reached the Colorado and the Green rivers, where they came upon another famous Colorado frontiersman named Robidoux, with his party of five trappers.⁶⁶ The itineraries of these various expeditions were never written, but we are certain that all of Colorado was overrun by adventurous fur gatherers in the '20s. Some of these trappers pursued the beaver but a single season and returned to civilization, while others grew old in the dangerous but fascinating pursuit. A few men and companies emerged as important characters and institutions of the West. Perhaps the most prominent of these in Colorado was the Bent & St. Vrain Company.

The Bent brothers, who became famous in the trade of the Southwest, were of a prominent St. Louis family, their father, Silas Bent, being a judge on the bench of the Missouri Supreme Court. His son William, who became the most famous of the brothers engaged in the fur trade, was born at St. Louis in 1809, the year that also marked the birth of Kit Carson. William Bent seems to have first engaged in the Western trade in 1824, and two years later had a temporary post above Pueblo on the Arkansas River.⁶⁷ Charles and William Bent and Ceran St. Vrain were the chief factors in an organization known as the Bent & St. Vrain Company, famous in Southwestern history. In its palmy days this company had a host of employes, and many wagons lumbered along in its caravan toward the States with the year's product of the trade.

A number of important fur companies operated from

⁶⁵ Chittenden, *op. cit.*, II, 506.

⁶⁶ *Ibid.*, 507.

⁶⁷ G. B. Grinnell, *Bent's Old Fort and Its Builders*, 2.

St. Louis westward during the fore part of the nineteenth century. Each of these dispatched toward the mountains trappers who helped reveal the geography of the West. The earliest of these was the Missouri Fur Company, formed in the winter of 1808-9 by Manuel Lisa, a former Spanish subject.⁶⁸ The Upper Missouri was the principal field of this company's activity and therefore we are but little concerned here with its work.⁶⁹

J. J. Astor founded the American Fur Company in 1808, and worked out plans for the development and control of the fur trade of the Northwest Pacific coast. His company met with distinct reverses as a result of the War of 1812, losing Astoria to a British company; and not until some years after peace was restored did its business prosper. Its activity was confined in the earlier years to the region north of Colorado, and its agents did not exploit the fur resources of this state until the fourth decade of the century. In the meantime another fur company had arisen whose men were destined to play a more important part in the exploration of Colorado.

Gen. William H. Ashley and Andrew Henry in 1822 launched the organization that later became known as the Rocky Mountain Fur Company. They brought into the West a body of young men who became the great explorers of the Rocky Mountain region. Prominent among these were: Jedediah S. Smith, William L. Sublette, James Bridger, Thomas Fitzpatrick, James P. Beckwourth, Etienne Provot, Robert Campbell and Louis Vasquez. During the first two years the Ashley-Henry men operated in the Upper Missouri country, but thereafter they turned farther south to the Central Rocky Mountain region.

⁶⁸ Chittenden, *op. cit.*, I, 129.

⁶⁹ One party of Missouri Fur Company trappers may have entered Colorado territory in 1811, but of this we cannot be certain. Andrew Henry accompanied the company's first expedition up the Missouri River in 1809. In 1810 he led a small party over the continental divide and founded a post on the upper Snake River. After spending the winter here the party broke up, some returning to the States while others struck out for the Spanish country. It is supposed that these latter journeyed through Colorado, but whether or not they reached New Mexico is not known.

Ashley substituted the rendezvous for the permanent post.⁷⁰ The trappers separated into little groups and followed the streams wherever beaver led. At some sheltered valley they assembled for mid-winter encampment and in summer gathered at a place of rendezvous previously agreed upon. The first great rendezvous was held on the Green River near the northwest corner of Colorado in the summer of 1825. The route of General Ashley in bringing out the supplies of goods to this point is of importance to Colorado history. He was the first white man of whom we have record to traverse portions of the route which later became famous as the "Overland Trail."

Leaving the Missouri in November, 1824, with twenty-five mountaineers, fifty pack horses, a wagon, and teams, he directed his course up the valley of the Platte River, following the route taken by Major Long four years before. At the mouth of the Cache la Poudre he left the South Platte and followed its western affluent. Skirting the Medicine Bow Range and rounding Elk Mountain, he turned westward to the North Platte and after crossing this stream made his way over the Continental Divide at Bridger's Pass, and continued westward to the Green River. Here three parties were dispatched in as many directions while Ashley built a boat and with six men floated down the Green River on a tour of exploration.

At the mouth of Henry's Fork, on the Wyoming-Utah boundary, he selected and marked the place of general rendezvous and then continued down the river. Making his way through Flaming Gorge Canyon, Red Canyon and over Ashley Fall, he reached Brown's Hole in Northwestern Colorado. This entry in 1825 is the earliest visit to this interesting section of which we have record.⁷¹ Upon proceeding down the river the way was again obstructed by Disaster Falls, around which the goods from the boats had to be carried. Near the middle of May the mouth of our Yampa River was reached. This stream received from Ashley the name "Mary's River," but the appellation did not long persist. Ashley followed down the Green River

⁷⁰ H. C. Dale, *The Ashley-Smith Expeditions*, 111.

⁷¹ *Ibid.*, 144.



COLORADO FUR TRADERS OF THE '30s

Upper: Kit Carson, William Bent

Lower: Jim Baker, Jim Bridger

some distance into Utah and then turned northward over the Uintah Mountains and reached the place of rendezvous in July. The Ashley party were the first white men to penetrate the great Green River canyons. In this difficult voyage they had been forced on sixteen occasions to portage the contents of their boats around treacherous falls or rapids.

The assemblage at the rendezvous was a typical scene from the fur trade drama. It was the fair of the wilderness, and a great occasion for trappers who for months had lost themselves in the mountains. The brief holiday invited jollification and dissipation. Races and contests of skill were arranged, and gambling and the drinking of bad whiskey were indulged in. Flour, sugar, and coffee were procurable and the continuous meat diet of months was now varied by the introduction of these luxuries from the States. Indians came in, set up their lodges and participated in the fiesta. Beaver skins were money and with these hairy banknotes the trapper could satisfy every primitive need. White trappers with Indian wives bestowed upon their spouses the trinkets and gay draperies that gladdened the feminine heart. Most of the trappers were of the open-handed sort who in the day or two of prodigal living dispensed their year's earnings. The dangers of the trail fascinated rather than repelled the mountaineer, and few who entered the life willingly forsook it. Around the campfire the adventures of the past year grew ever greater with the telling, and a shake of the head or a word of praise was the last boon of the trapper who no longer cast a lengthening shadow out into the night.⁷²

From 1824 to 1827 Ashley prospered greatly in the fur trade, and was able in the latter year to retire a rich man. His business was sold to three former associates—Smith, Jackson, and Sublette. These men conducted it until 1830, when they in turn sold out to Fitzpatrick, M. Sublette, Bridger, Fraeb, and Gervais, who operated under the name

⁷² See F. A. Wislizenus, *A Journey to the Rocky Mountains in the Year 1839*, for a good description of the Green River rendezvous of 1839. See also J. C. Alter's *James Bridger*, 63 and 135.

of the "Rocky Mountain Fur Company." During these years the fur trade was prosecuted with vigor, several hundred men being employed in trapping beaver and trading for furs. The routes of these little bands cannot be followed here nor can their many tragedies or hair-breadth escapes be detailed; in fact, most of this information is already permanently lost to history. We know, however, that Colorado territory was explored and exploited for its furs. One of the earliest of these parties to take advantage of the fur resources of Northwestern Colorado was led by Henry Fraeb and Jean Baptiste Gervais in 1830. They left the Wind River rendezvous in Wyoming in August and turned southward into Colorado. We cannot follow their route, but they must have visited North and Middle Parks and the valley of the Yampa.⁷³ They remained in this region for a year, emerging the following summer and proceeding to the Green River rendezvous.

In the meantime Thomas Fitzpatrick had followed an unusual route to the Green River rendezvous (1831). He had gone to the States for the annual supplies, and was induced to accompany a trading caravan to Santa Fé. This carried him far from the direct course to Green River, for after traveling nearly 1,000 miles he had an almost equal distance yet before him.⁷⁴ From Santa Fé Fitzpatrick led his supply train northward across the entire State of Colorado, skirting the foothills of the Front Range. His route must have been along what became famous as the Taos Trail. Within a decade a well marked wagon road followed this route, going from the Arkansas River northward to the South Platte and the mouth of the Laramie.

The year 1831 saw a fur trade venture under Captains Gant and Blackwell into the Colorado region. With seventy men they left St. Louis in April, 1831, and following up the Platte River reached the Rocky Mountains.⁷⁵ Here the men were divided into smaller parties and sent along various streams into the mountains while Blackwell returned to the States to bring out supplies the following

⁷³ Chittenden, *op. cit.*, I, 293.

⁷⁴ *Ibid.*, I, 294.

⁷⁵ W. F. Wagner, ed. *The Narrative of Zenas Leonard*, 59.

summer. Zenas Leonard has given us an account of the poor success of one of these parties (under Stephens), but Gant's movements during the winter cannot be followed. However, we learn of him early in the spring of 1832, through the accession to his party of Kit Carson. This famous scout, after a trip to California under Ewing Young, returned to New Mexico and joined Fitzpatrick in the fall of 1831.⁷⁶ In the spring of 1832 Carson and four other trappers left the Rocky Mountain Fur Company and went to join Captain Gant, who was in South Park. After trapping in the North Park and on the South Platte, this enlarged party went to the Arkansas River, while Captain Gant continued to Taos to dispose of the furs and obtain supplies. Returning to the Arkansas, Gant built a post on this stream and the fall trapping was conducted in this neighborhood. Kit Carson remained with Gant most of the following year and then after a period of independent trapping joined Captain Lee. He and Lee followed the Spanish trail through Southwestern Colorado and turning northward encountered Robidoux and twenty men at the mouth of Uinta River. During the early '30s Gant and Blackwell's company and Robidoux's men were the chief competitors of the Rocky Mountain Fur Company in the mountain region of present Colorado.

The rendezvous of 1832 at Pierre's Hole was a noteworthy one in the fur trade. The Rocky Mountain Fur Company was feeling the effect of competition. The American Fur Company was rising to supremacy and, in addition, two new organizations were in the field, led by Nathaniel Wyeth and Captain Bonneville, respectively.

In 1834 the Rocky Mountain Fur Company was dissolved, some of the partners becoming independent trappers while others took service with their successful rival, the American Fur Company.⁷⁷ This latter organization came

⁷⁶ D. C. Peters, *Life of Kit Carson*, 56. Peters gives the date as 1830, but Fitzpatrick's journey to Santa Fe was in 1831. By checking Carson's movements with Leonard's Narrative we see also that Peters (very inaccurate with dates), is one year off at this point.

⁷⁷ Chittenden, op. cit., I, 304. Reproduction of dissolution agreement in vol. II, 864.

to be known to the traders as "the Company" during the succeeding decade.

During the '30s many independent trappers operated in territory that has become Colorado. Some of these were former owners or employees of the Rocky Mountain Fur Company, while others were "free lances" who for years had come and gone as they pleased. It would be impossible to name the host of individual trappers who made Colorado their temporary home in the '30s and '40s, but the fur trade posts around which their activities centered can be located with a fair degree of accuracy. A keen competition developed among the companies and men engaged in the fur trade, which resulted in the establishment of competitive trading posts on the Arkansas and Platte rivers.

By whom the first trader's "fort" was established it is impossible to say with certainty, for the earliest posts were temporary log structures that quickly disappeared. It is possible that Chouteau and De Munn had a house on the upper Arkansas during the years of their trading in that vicinity (1815-17), but no report of it is found. The log houses built on the upper Arkansas by Jacob Fowler in the winter of 1821-2 can scarcely be called trading posts or forts.

Probably the first post reared on Colorado soil was that built by the Bent brothers and Ceran St. Vrain. It appears to have been built of logs and to have been located on the Arkansas some distance above modern Pueblo.⁷⁸ The early activity of the Bent & St. Vrain Company was but preliminary to the founding of their great institution which came to be known as "Bent's Fort." This famous establishment was located on the north bank of the Arkansas about eight miles above the mouth of the Purgatory River and hence farther down the stream than their earlier post had been. Bent's Fort had a good location commercially.

⁷⁸ The location and the date of building of this fort cannot be fixed with certainty. Grinnell in his *Bent's Old Fort and Its Builders*, 2, says that Charles and William Bent probably entered the fur trade on the upper Arkansas in 1824, and quotes George Bent as saying that there were two stockades built: the first in 1826, above Pueblo; the second, near the mouth of the Purgatory, about 1828.

It was in the buffalo country and hence admirably situated for the Indian trade. Being on the mountain division of the Santa Fé Trail, it could profit from the heavy traffic which annually was carried over this first great commercial highway of the West. The building of Bent's Fort commenced in 1828, but not until four years later was the great adobe structure completed.⁷⁹ This was the first great trading post established in the Central West, and since it became the model for subsequent posts, we shall describe briefly its chief features.

Lieut. J. W. Abert, who accompanied Captain Fremont as far as Bent's Fort in 1845, has left us the best drawing of the famous fort (reproduced on page 319). The fort was built of large gray adobes and was in rectangular form, about 180 by 135 feet.⁸⁰ The walls were from two to four feet thick and fifteen feet high. Round bastions projecting from the southeast and northwest corners of the enclosure rose four feet above the wall and were provided with loopholes for musketry and cannon.⁸¹ Midway in the eastern wall was a large gateway fitted with two great heavy plank doors plated with sheet iron. Over the gateway rose a square watchtower, capped with a belfry and flagstaff. Within the fort were rows of low rooms backed against the outer wall and having doors opening into the central court. These were like the common Mexican houses with dirt floors and with clay and gravel roofs which were supported by pole beams. The rooms comprised the warehouses, living rooms, kitchen, and the quarters for the post attachés. Sheds provided shelter for yokes, harness, and

⁷⁹ *Ibid.*, 4.

⁸⁰ These figures are given by J. T. Hughes in his *Doniphan's Expedition* (1847), 26. Hughes was of the First Regiment of Missouri Cavalry and accompanied Doniphan. Lieutenant Abert does not give the dimensions of the fort. Garrard says the post was 100 feet square and the walls 30 feet high. These are loose approximations and inaccurate.

⁸¹ Grinnell says these bastions were 30 feet high, but this must be an error. Abert says they rose but four feet above the walls and the drawing by Abert and the one in Hughes' account (p. 36) both show the bastions rising but a few feet above the level of the walls.

other caravan equipment. At the back, or west side, of the fort, was the cattle corral enclosed with an adobe wall somewhat lower than that enclosing the fort proper. Upon the coping of this wall were planted cacti, which served as decorative and protective features for the stockyard. On the river bank, 200 yards south of the fort, an adobe ice house was located. This was filled with ice in winter, and in summer a supply of fresh meat was here preserved.

Life about the fort was picturesque. Bronze-faced hunters and bearded trappers in their fringed buckskin suits made this their headquarters. Their Indian women in beaded and quill-decorated deerskin dresses glided about with moccasined feet, through the rooms, across the gravelled courtyard, and mounting the flat roofs peered over the protecting outside wall. Naked children played in the shadow of the great wall and slight indications of white blood showed through the darker hue of their mothers' race. Clerks and traders had feverish days of merchandising followed by languid weeks filled with lounging and smoking and the telling of tales. Mexican mestizoes and French Canadians furnished additional features for the scene, and when the trading parties of Arapahoes or Cheyennes came in, the drab fortress was transformed into a colorful, semi-oriental mart.⁸²

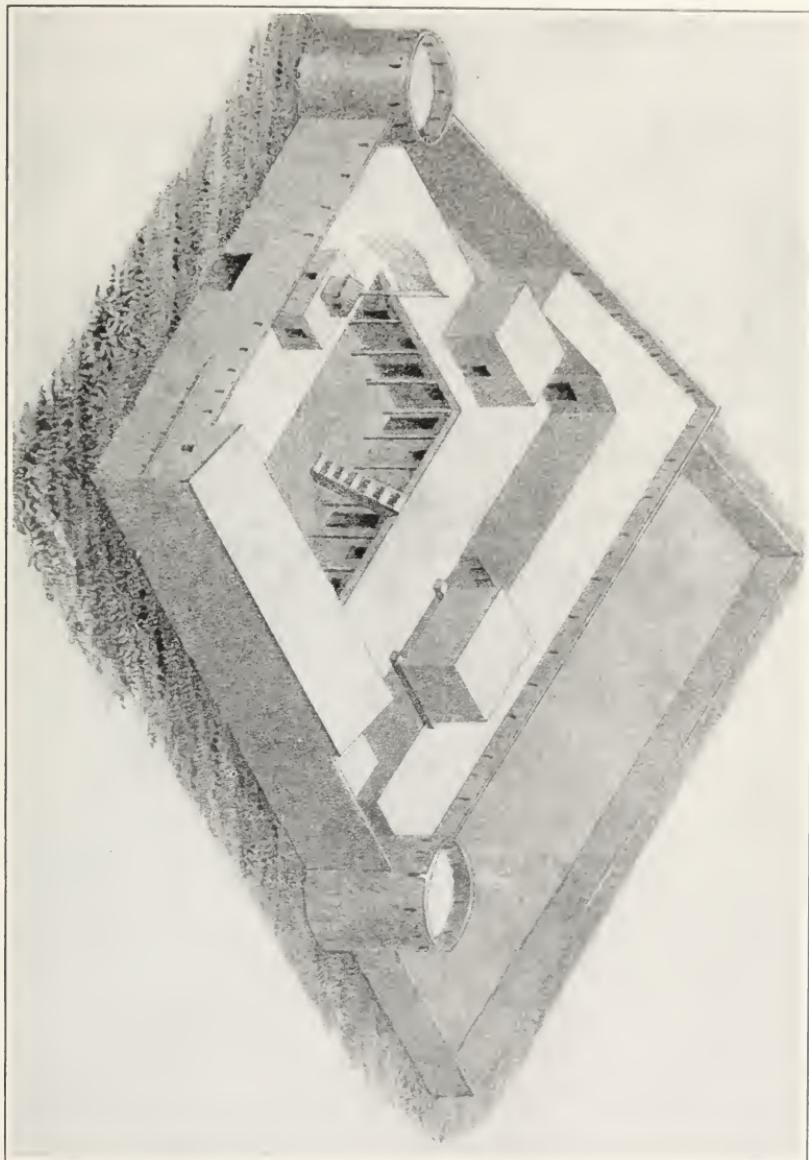
For two decades this fort stood as the commercial center of a vast area. Then in 1852 it was deserted and destroyed by its founder.⁸³ Thus passed the most impor-

⁸² To every traveler into the Southwest, Bent's Fort appeared as a noteworthy and significant institution. A few visitors who left accounts follow: Colonel Dodge, 1835; Wislizenus and Farnham, 1839; Fremont, 1843, 1844, 1845, 1848; Abert, 1845; Parkman, 1846; Ruxton, 1847. Kit Carson was employed as hunter for the post for some time during the thirties.

⁸³ William Bent had endeavored to sell his fort to the government for a military post, but the negotiations failed. Unable to obtain what he considered a fair price, Bent decided to blow up the post, and this he accordingly did. The next year Bent's New Fort was established on the north bank of the Arkansas opposite the present town of Prowers. It was built of stone and was much smaller than the old post. In 1859 it was leased to the government and converted into Fort Wise (later Fort Lyon)—Grinnell, *op. cit.*, 60. William Bent died May 19, 1869, and Ceran St. Vrain in 1870.

BENT'S FORT

Most famous trading post in Colorado. Situated on the Arkansas River near La Junta
Sketch by Lieut. J. W. Abert, 1845



tant trading post and fort of Colorado's history. Bent's Fort was the first residence and the initial business establishment in Colorado; while its founder, William Bent, should rank as the first, as he was for thirty years the most prominent, citizen residing on territory that now comprises our state.

Although Bent's Fort was the most prominent commercial depot on Colorado territory in fur trade days, it did not stand alone on the banks of the Arkansas. We have already mentioned houses that preceded it; now let us look at its contemporaries. Gant and Blackwell established a trading post on the Arkansas in the fall of 1832.⁸⁴ Captain Gant is said to have been the first man to form friendly relations with the Arapahoes and to cultivate their taste for whiskey.⁸⁵ This post was evidently shortlived, for in 1835 Gant was guide for Colonel Dodge and the First Dragoons and subsequently became a trader among the Potawatomi Indians east of the Missouri River.

About the year 1830 Maurice LeDoux, a French trader from Detroit, is said to have established a trading post on Adobe Creek near the Arkansas River, and soon thereafter a little Mexican agricultural settlement of thirteen adobe houses was founded near the mouth of the stream. Upon the approach of a band of Sioux and Arapahoes in

Charles Bent had been murdered at the Mexican uprising at Taos in January, 1847.

⁸⁴ W. F. Wagner, ed. *Adventures of Zenas Leonard*, footnote, page 59. Leonard says that Gant's party left the mouth of the Laramie in September, 1832, to "establish a trading post on the Arkansas River with the Arapahee [Arapaho] Indians" (p. 131). Kit Carson was at this "rude fort" while in Gant's employ—Peters' *Life of Kit Carson*, 67.

⁸⁵ Chittenden, op. cit., 969. Grinnell, op. cit., 17, 18. Chittenden says the post was six miles above the mouth of Fountain Creek, while Grinnell locates it five or six miles below the mouth of this stream. R. Sage, *Rocky Mountain Life*, 303, says "Some six miles below the mouth of Fontaine qui Bouit are the ruins of an old fort, occupied several years since by one Captain Grant [Gant] as a trading post." Lieutenant Kingsbury, journalist of the Dodge expedition of 1835 says (U. S. House, 24 Congress, 1st sess. doc. no. 181, p. 23) that they "passed a deserted trading establishment," a few miles below the mouth of Fountain Creek. This was probably the Gant and Blackwell post.

1838 these settlers took refuge in Maurice's fort, and a severe encounter took place in which Maurice and his companions were victorious.⁸⁶ In July, 1843, Fremont met Maurice on Fountain Creek and writes that he "had been out into the plains in pursuit of buffalo calves, a number of which I saw among some domestic cattle near his lodge."⁸⁷ An American settlement is said by Mr. Rockafellow to have been founded on Adobe Creek in 1840; to have been sponsored by Bent, Lupton, St. Vrain, Beaubien, and Maxwell; and to have been in charge of Mr. Beaubien (of Beaubien Land Grant fame). It is said that this settlement was deserted by Americans in 1846, but that Mexicans continued to live here periodically, and that among the trappers and settlers the site was called "Buzzard Roost."⁸⁸

El Pueblo, a little trading post and agricultural settlement, was founded four or five miles west of Bent's Fort in the late '30s. Both Farnham and Wislizenus noted it in 1839 and speak of it as a post established by retired American and Mexican trappers who were devoting themselves to agriculture and stock raising.⁸⁹

"The Pueblo," on the site of modern Pueblo, was founded by independent trappers in 1842. Prominent among the

⁸⁶ These data are from B. F. Rockafellow's "History of Fremont County" in Baskin's *History of the Arkansas Valley, Colorado* (1881), 545. The information was obtained from J. A. Toof (a Colorado pioneer) to whom Maurice was said to have given the facts in 1860. The dates here given have not been authenticated. Mr. Toof said Maurice gave all dates by moons. The fact that Mr. Farnham, when going up the Arkansas in 1839 makes no mention of Maurice's fort or the Mexican settlement would indicate that they had not been founded prior to 1839. Smiley (p. 174) speaks of this trader as Maurice "Le Doux," but cites no authority.

⁸⁷ J. C. Fremont, *Report of the Exploring Expedition to Oregon and North California in the Years 1843-44*, 115.

⁸⁸ B. F. Rockafellow, op. cit., 546. Rufus Sage, op. cit., 222, writes in 1842: "A small settlement of whites and half-breeds, numbering fifteen or twenty families, has already been commenced about thirty miles above the mouth of Fontaine qui Bouit under quite favorable auspices."

⁸⁹ Farnham's *Travels*, 173. Wislizenus, (p. 141) renders the name "Peeble's Fort," and locates it four miles above Bent's Fort.

founders and residents of this post were George Simpson and the famous mulatto trader, James Beckwourth, both of whom have claimed the honor of founding this establishment.⁹⁰ The fort was a rectangular structure built of adobes with a number of low rooms backed against the outside wall. Fremont visited it in 1843 and spoke of the fort as being occupied principally by American mountaineers with Spanish wives.⁹¹ Parkman in 1846 and Ruxton in 1847 visited the fort and left interesting descriptions of the rude post and its denizens.⁹² During the winter of 1846-7 a company of Mormons took up a temporary residence in the vicinity of the fort, but moved on to Utah the following spring. As the fur trade dwindled Fort Pueblo declined and decayed. On Christmas day, 1854, the tragic finale to its brief history was enacted. A band of Utes attacked the fort and only one of the seventeen Mexicans housed there escaped to tell the tale of the massacre.⁹³ The site now remained unoccupied until the gold seekers came in 1858.

The success of the Bent & St. Vrain Company on the Arkansas stimulated others to enter the trade and occupy

⁹⁰ Smiley, in his *History of Colorado*, 175, gives Simpson the credit for founding the fort. In Bonner's *Life of James P. Beckwourth*, it is claimed that Beckwourth was the principal man among the founders. The present writer is indebted to Henry A. Dubbs (president of the State Historical and Natural History Society of Colorado, and perhaps the best informed scholar upon the history of the upper Arkansas Valley) for an interesting point in connection with the founding of Fort Pueblo: Beckwourth says that in the fall of 1842 he came up from Taos, reached the Arkansas about October 1st, and erected the trading post named "Pueblo," and carried on business there until after the spring trade of the next year. Sage, under dates September 19th to 22d, 1842, describes the trading post, called "the Pueblo" and says (p. 222) it "was built during the summer of 1842." This appears as strong evidence against Beckwourth's claim as founder of the fort.

⁹¹ Fremont, op. cit., 116.

⁹² Parkman, *The Oregon Trail*, 255.

G. F. Ruxton, *Adventures in Mexico and the Rocky Mountains*, 223.

⁹³ H. L. Conard, *Uncle Dick Wootton*, 305. Also, R. M. Stevenson's "History of Pueblo County," in Baskin's *History of the Arkansas Valley, Colorado* (1881), 765.

a competing field. In the late '30s a number of competing traders established posts on the South Platte between present Denver and Greeley. A log fort was probably erected by Louis Vasquez at the mouth of Clear Creek in 1832,⁹⁴ and between 1836 and 1838 four adobe posts were established on the South Platte. These posts were noted by Doctor Wislizenus in 1839, Rufus Sage in 1841-2, and Fremont in 1843. Regarding one of these practically nothing is known,⁹⁵ but of the other three fairly definite data are available.

Accompanying Col. Henry Dodge to the Rocky Mountains in 1835 was a young lieutenant—Lancaster P. Lupton. He evidently saw the possibilities of the fur trade in this region, resigned from the army the following year, and came west to engage in the enterprise. Fort Lupton, at first called Fort Lancaster (located about one mile north of the town of Fort Lupton, on the Ewing ranch), was built in 1836 or 1837. Part of the original wall and hewn timbers are still in use.

The principal wall of Fort Vasquez was built in 1837 by Louis Vasquez and Andrew Sublette.⁹⁶ The ruins of this fort are better preserved than those of any other fur trade post in Colorado. The enclosure was 110 by 100 feet and parts of the wall are still four feet high. The ruins are but a mile south of Platteville, and stand just a rod off the paved highway. Perhaps at no other place are the evidences of the old and the new in Colorado history more strikingly contrasted. What once as a high wall and commanding bastion stood a proud outpost of civilization has become in less than a century a crumbling relic of an

⁹⁴ To the pioneers of 1859-61 present Clear Creek was known as "Vasquez Fork." It was said to have received this name because of the existence of Vasquez's post at its mouth. No authentic data has been found which establishes definitely the existence of such a post, but that it was so founded is not improbable. If built, it was shortlived. Colonel Dodge did not note it upon his journey up the Platte in 1835.

⁹⁵ A fuller discussion of these posts is to be found in L. R. Hafen, "The Early Fur Trade Posts on the South Platte," in the *Mississippi Valley Historical Review*, vol. XII, 334-341.

⁹⁶ *Ibid.*, 338.

almost forgotten day. The winding, dusty, trappers' trail to the fort and beyond is now a thin, long line of glaring concrete. The walls which sheltered the initial commerce of Colorado, now in crumbling ruin, vibrate to the throbbing of modern transportation.

It was most probably the presence of Forts Lupton and Vasquez on the South Platte that induced the Bent & St. Vrain Company to establish a competing post in this region. The fort erected was a sort of branch of the larger establishment on the Arkansas and came to be known as Fort St. Vrain. It was established in 1837 or 1838 and for a few years sheltered an active life. But the fur trade was already on the wane and before a decade had passed these commercial outposts were deserted.

At least two fur trade forts were established in Western Colorado. One of these was built on the Gunnison near the mouth of the Uncompahgre. Its founder, the trapper Robidoux, was in that vicinity as early as 1824 and remained for two or three decades one of the principal traders on the Western Slope. Fort Robidoux on the Gunnison was built of logs and had already disappeared when Captain Gunnison passed the site in 1853. The other Western Colorado fort was situated in Brown's Hole, on the Green River, in the extreme northwestern corner of the state. It was known as Fort Davy Crockett and was probably founded about 1837. In 1839 it was visited and described by Doctor Wislizenus and by T. J. Farnham, and at this time was owned by three American trappers—Thompson, Craig and St. Clair.⁹⁷ It was "a hollow square of one-story log cabins with roofs and floors of mud."⁹⁸ In the declining years of the fur trade this post had very meagre resources and came to be known among trappers as "Fort Misery."

EXPLORERS AND TRAVELERS

The great majority of the trappers and fur traders who roamed over Colorado territory during the first half of the nineteenth century left no record of their explorations. But

⁹⁷ Chittenden, *op. cit.*, 971. Wislizenus (p. 129) renders the names "Thompson, Gray, and Sinclair."

⁹⁸ Farnham, in Thwaites' *Early Western Travels*, XXVIII, 251.

there came to our mountains and valleys in the second quarter of the century, government explorers, military men, and travelers, who have left us interesting accounts of what was seen and done in this virgin land before plows turned the soil or miners burrowed holes in the mountains.

Accounts of the first official expeditions into Colorado—those of Captain Pike and Major Long—have been previously given. The next government expedition to this region was composed of Colonel Henry Dodge and three companies of the First Dragoons. Mounted on horses, supplied with sixty days' rations of flour and twenty-five beeves, and defended by two three-pounders on wheels, Colonel Dodge with his 120 men set out from Fort Leavenworth May 29, 1835.⁹⁹ The Dragoons took a course very similar to that of Major Long in 1820—following up the Platte and its south fork to the mountains, turning southward over the Divide, and descending the Arkansas to the States. The expedition was a rather pleasant summer tour with no unusual difficulties or incidents marking the journey. Councils were held with the Ottoes, Omahas, Pawnees and the Arickaras at various points in present Nebraska; and at Bent's Fort the Arapahoes and representatives of some other tribes were met in council. Peaceful conditions prevailed, friendly relations with the United States government were advanced, and the children of the plains were impressed with a body of United States troops larger than any which had previously visited their country. No region was visited that had not been previously explored and described, and therefore we shall not more fully detail the incidents of the journey.

Four years later Colorado was completely crossed by two remarkable travelers who have left us two of our earliest accounts of central and northwestern Colorado. Thomas J. Farnham, an Oregon-bound emigrant from Illinois, and Dr. F. A. Wislizenus, a German physician from St. Louis

⁹⁹ Colonel Dodge's Journal, in U. S. House, Doc. no. 181, 24th Cong., 1st session. The journal of the expedition is by Lieut. Kingsbury, and Colonel Dodge writes a brief report which accompanies the journal. Another journal of the expedition (Captain Ford's) was recently published. See *Mississippi Valley Historical Review*, XII, 550-579.

met at Fort Davy Crockett in northwestern Colorado in 1839 when they were making their journeys across our territory in opposite directions.

Thomas Jefferson Farnham, a young lawyer from Vermont was living in Peoria, Illinois, in the fall of 1838 when the pioneer Oregon missionary, Jason Lee, toured the Middle West lecturing upon Oregon and raising funds for his missionary work. The glowing descriptions painted by Reverend Lee led to the organization of a small emigrant band who prepared to set out the following spring for the land of promise in the northwest. Styling themselves the "Oregon Dragoons," and bearing a flag with the motto "Oregon or the Grave," these nineteen young adventurers turned westward into a region and a life with which not one of them was familiar.¹⁰⁰ The Santa Fé Trail and its mountain division was followed to Bent's Fort, where as a result of disagreements, the party divided. The "mutineers" turned northward to the South Platte forts and then continued to the Oregon Trail; while Farnham and four companions continued up the Arkansas into the mountains. Kelly, a Kentuckian who had spent the past twelve years in the service of the American Fur Company, was secured as guide.

From the site of Canon City they turned northward, probably up Oil Creek, and crossed the divide into South Park.¹⁰¹ After continuing northward through the Park they turned to the west and crossed the continental divide (most probably at Boreas Pass) to the upper waters of Blue River. Descending the Blue and crossing the Colorado they turned northwestward over the Park Range and to the headwaters of the Yampa. Here they came upon the site of a little log fortress which had been built by their guide,

¹⁰⁰ Thwaites, *Early Western Travels*, XXVIII, 10.

¹⁰¹ Farnham calls Pikes Peak, "James' Peak" and transfers Pike's name southward to the Spanish Peaks near the southern boundary of Colorado. During the week July 11-18th, Farnham crossed affluents of the Arkansas which he called Fontequebouir, Kelly's Creek, Oakley's Creek, and Wood's Creek. These most probably were Fountain Creek, Turkey Creek, Beaver Creek, and Oil Creek, respectively. He also speaks of the "Rio Wolfano," by which he means the Huerfano.

Kelly, several years before, and in which he had for seven days defended a sick companion from an Indian attack.

A fearful time that, [said Kelly] the redskins saw every turn of our heads during those seven days and nights. But I baited our horses within reach of my rifle during the day, and put them in that pen at night; so that they could not rush off with them, without losing their brains. The buffalo were plenty here then. The mountains were then rich. The bulls were so bold that they would come close to the fence there at night, and bellow and roar till I eased them of their blood by a pill of lead in the liver. So you see I did not go far for meat. Now, the mountains are so poor that one would stand a right good chance of starving, if he were obliged to hang up here for seven days. The game is all driven out. No place here for a white man now. Too poor, too poor. What little we get, you see, is bull beef. Formerly, we ate nothing but cows, fat and young. More danger then, to be sure; but more beaver too; and plenty of grease about the buffalo ribs. Ah! those were good times; but a white man has no more business here.¹⁰²

Interesting, to hear a man in 1839 speak of the good days in Colorado as having already passed!

Passing Steamboat Springs the wayfarers continued down the Yampa, but as game was scarce their situation became almost desperate. Eight miles above the mouth of the Little Snake River they turned northwestward, and on the 12th of August were received into the humble but hospitable Fort Davy Crockett.¹⁰³ Here Farnham met a party returning from Fort Hall (among whom was Dr. Wislizenus) and their unfavorable report upon Oregon induced two of his companions to turn back. Farnham, however, determined to go on, and with two companions and an Indian guide continued to Oregon. In his interesting book, *Travels in the Great Western Prairies* he has left us a picturesque account of the first recorded journey (1839) across the entire breadth of our state.

Interlocking with Farnham's expedition at Brown's Hole was the Wislizenus journey, which also deserves a place in Colorado history. Dr. Wislizenus had left St. Louis in April, 1839, bound for the Northwest.¹⁰⁴ After reaching

¹⁰² Farnham's *Travels*, op. cit., 233.

¹⁰³ Kit Carson, Joe Meek and other mountaineers were at Fort Davy Crockett at this time—Victor's *River of the West*, 257.

¹⁰⁴ The account of this journey is preserved in F. A. Wislizenus, *A Journey to the Rocky Mountains in the Year 1839*.

Fort Hall via the Oregon Trail he decided to return and in so doing to traverse the country to the south of the regular emigrant road. In August he met Farnham's party at Fort Davy Crockett and with two new recruits turned toward the east. A trappers' trail north of the Yampa led them in an almost due eastern course to the Little Snake River (affluent of the Yampa). This stream and its St. Vrain branch were followed to the continental divide and descent was made to the upper waters of the North Platte. Turning southeastward, probably along the course that afterward became known as the Cherokee Trail, he reached the South Platte. The fur trade posts upon this stream were visited and described, and then the road of the trappers' supply wagons was followed up the Platte and Cherry Creek and over the divide to the Arkansas. At Bent's Fort (which with his German dialect he renders "Penn's Fort") he noted the cattle, sheep, goats and buffalo calves which were grazing about the fort and described the famous adobe structure as "the finest and largest fort which we have seen on this journey." Continuing down the Arkansas, Wislizenus reached Westport in October, having spent six months beyond the settled frontier, and having traveled approximately 3000 miles.

A traveler whose wanderings about Colorado in this early period were more extensive than those of any other who has left his story, was Rufus Sage. In the fall of 1841 he joined a company of fur traders bound for the West and after spending the winter hunting and trapping on the North Platte returned to the States. The summer of 1842 saw him again pursuing the westward trail, and, following the south fork of the Platte, he now entered Colorado territory. About ten miles above the mouth of Bijou Creek he came upon a camp of Bent and St. Vrain Company's trappers. The descent of the river with packs of furs had been prevented by low water and they were guarding their furs on an island which the leader of the party called "St. Helena." This fur trade captain, an interesting half-breed Frenchman named Charbonneau, is beyond doubt the son of Lewis and Clark's guide—the papoose who was carried across the continent on the back of the famous Bird Woman, Sacajawea, when she guided the expedition to the Columbia

in 1804-5. Sage writes of him as "a gentleman of superior information. He had acquired a classic education and could converse quite fluently in German, Spanish, French, English, as well as several Indian languages. His mind also, was well stored with choice reading, and enriched by extensive travel and observation."¹⁰⁵

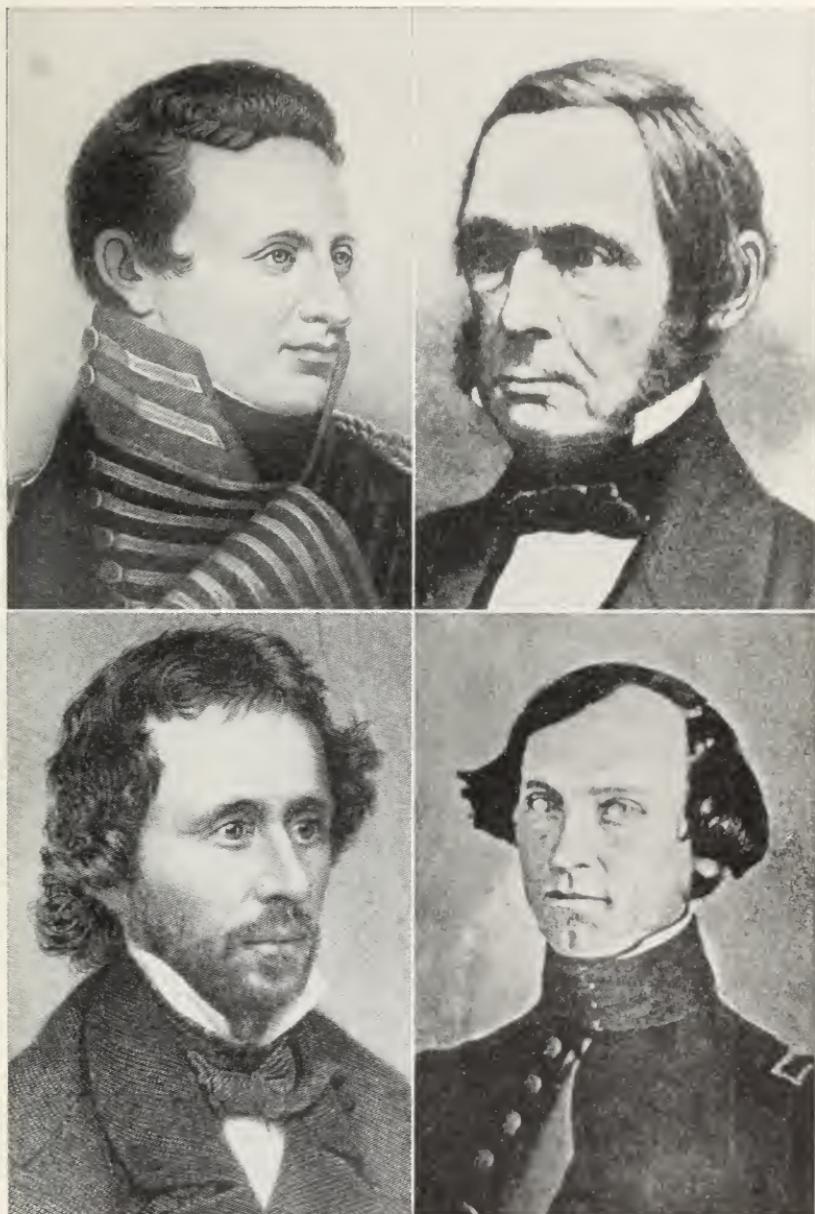
Continuing up the Platte, Sage came upon the rival fur trade posts located above the mouth of the Cache la Poudre. At Fort Lupton a party of Mexican traders from Taos was encountered "escorting a caravan of pack-horses and mules, laden with flour, corn, bread, beans, onions, dried pumpkin, salt, and pepper, to barter for robes, skins, furs, meats, moccasins, bows and arrows, ammunition, guns, coffee, calico, cloth, tobacco, and old clothes, which were to compose their return freight. * * * A more miserable looking gang of filthy half-naked ragamuffins, I never before witnessed."¹⁰⁶

On September 10, 1842, Sage and four companions set out for Taos. Having camped with a company of tree trappers at the site of present Denver, they continued up Cherry Creek, over the divide and to the Arkansas. After a short stay at the newly-established Fort Pueblo, they crossed the Arkansas and took the Taos Trail to New Mexico. At Taos, Sage joined the fur trader Robidoux, and journeyed with him to his fort on the Uintah in eastern Utah. The route taken seems to have been the path which became known as the Old Spanish Trail. They took a westward course which probably brought them across the continental divide in Southwestern Colorado. At the Uintah Fort, Sage joined some trappers northward-bound and reached Fort Hall November 9, 1842, having journeyed via Brown's Hole.

On the 20th he was again on the move, now with face turned eastward. Following practically the same route which Wislizenus had taken three years before, he reached New Park (North Park) in ten days. Here he left his predecessor's path and turned southward over the range to the waters of the Colorado River in Old Park (Middle Park). Following the Blue River to the junction of its three

¹⁰⁵ Rufus B. Sage, *Rocky Mountain Life*, 206.

¹⁰⁶ *Ibid.*, 211.



EARLY OFFICIAL EXPLORERS OF COLORADO

Upper: Zebulon M. Pike and Stephen H. Long

Lower: John C. Fremont and John W. Gunnison

branches in what was known as "La Bonte's Hole" (vicinity of present Dillon), he followed up the middle branch and crossed the continental divide into South Park. Continuing southeastward he emerged from the mountains upon Fountain Creek a few miles above the soda springs, and then turned northward along the foothills to the South Platte. Buffaloes being found in plenty in the valley of Cherry Creek (the snow having driven them in from the prairie to the river bottoms), ten days were occupied in procuring meat. In the middle of January, 1843, he moved six or eight miles below the mouth of Cherry Creek and settled into winter quarters.

In February, Sage met at Fort Lupton a Texan officer, Colonel Warfield, recruiting men for a military expedition against Santa Fé. He decided to join the forces and accordingly journeyed to the place of rendezvous at the site of modern Las Animas (in territory claimed by both Texas and Mexico). The military movement was meagre and ineffectual and by mid-summer had been abandoned. Sage once more returned to his favorite hunting grounds on the South Platte, where he met Fremont in July. After spending another winter in this vicinity he returned to the States in July, 1844, having spent the greater part of three years in Colorado. Rufus Sage has left us not only an account of his remarkable wanderings but a fairly accurate description of almost every portion of our state. The flora and fauna, the mountains, streams, and prairies, and the aboriginal inhabitants who wandered over the virgin region are all noted in this early account of pre-settlement Colorado.

In the year 1842 John C. Fremont began his famous series of exploring expeditions into the West. Though the appellation of "Pathfinder" hardly conforms to the nature of his work, he did, nevertheless, perform a valuable service for his country in the field of scientific exploration and accurate description. He was always accompanied by trappers and mountain men who were well acquainted with the country and were competent to act as guides. Fremont's first expedition was of little importance, being merely a summer tour over the already well-known Oregon Trail to South Pass. However, the side trip made by part of his company and himself up the South Platte to Fort St. Vrain

might be mentioned. No further penetration into Colorado territory was made, however, by the explorer upon this expedition.

In the spring of 1843 he set out upon a more extensive and important expedition. The gray-haired fur trader, Thomas Fitzpatrick, who for twenty years had roamed the West, was chosen as guide, while the majority of the other thirty-nine men were American trappers or French-Canadian woodsmen, alike accustomed to frontier life and hazards. Upon leaving the Missouri frontier the party received a valuable accession in the person of William Gilpin, later to become the first governor of Colorado territory.¹⁰⁷ The route taken was along the Kansas River and its Republican Fork. From the headwaters of the latter stream the party turned a little north of west and struck the South Platte a little above the present town of Sterling. Longs Peak was sighted July 1st, and three days later the national holiday was celebrated at Fort St. Vrain. With animals almost exhausted it became necessary to procure additional mules; and upon such a mission Lucien Maxwell (later of Maxwell Land Grant fame) was sent to Taos, where large numbers of animals were said to have recently arrived from California. Fremont and his party followed as far as the Arkansas, visiting the fur trade posts and hunting for buffalo in transit. At Fort Pueblo Fremont secured the services of Kit Carson, soon to become the most famous scout of the Rocky Mountains. Returning to St. Vrain's fort on the South Platte, the party divided, Fitzpatrick taking the supplies northward to the Oregon Trail while Fremont turned up the valley of the Cache la Poudre seeking a more direct western course. As he came upon the Laramie Plains, Colorado territory was left behind, and we shall therefore not follow him farther on his way to Oregon and California.

On the return journey of 1844 Fremont again traversed and described Colorado territory. He had traveled from Oregon to Southern California and then turned eastward along the Old Spanish Trail as far as central Utah. After

¹⁰⁷ J. C. Fremont, *Report of an Exploring Expedition to the Rocky Mountains in the Year 1842 and to Oregon and North California in the Years 1843-44*, 107.

crossing the Wasatch Range via Spanish Fork canyon he entered Colorado territory at Brown's Hole on Green River and encamped opposite the ruins of Fort Davy Crockett.¹⁰⁸ The route now followed through the Rocky Mountains to the waters of the Arkansas is almost identical with that taken by Rufus Sage two years before. This was along the Little Snake River (called by Fremont the "Elkhead") and over the divide to the North Park.

Instead of going over familiar ground down the North Platte he now turned in the opposite direction to explore the headwaters of the Colorado, Arkansas and South Platte rivers. These, he said, were well known to hunters and trappers but unknown to history and science. Upon crossing Muddy Pass they entered Middle Park; and thence crossed the Colorado River, ascended the Blue, and crossed the continental divide into South Park. While moving southeastward through this park they passed within close range of a battle between five hundred Ute and Arapaho Indians. Carefully avoiding any complications in the affair, they passed from South Park to the Arkansas River and reached Bent's Fort July 1, 1844. Here they were welcomed by George Bent and were made to feel at home. Carson, Walker and others remained here while Fremont and the greater part of his company returned to the States via the Smoky Hill River.

Fremont's third expedition was his largest and also his last official journey into the West. Although an exploring expedition, it was not concerned wholly with the acquisition of scientific knowledge. Relations with Mexico were strained, and far-seeing persons saw a war with Mexico on the horizon. Fremont had touch with the inner political councils of our nation and departed with certain secret instructions regarding action in California when the critical moment should arrive.¹⁰⁹ In view of this situation the expedition took on more of a military aspect than would otherwise have been the case. The real point of departure was Bent's Fort, which post was reached August 2, 1845. It was considered advisable to make a survey of the prairie

¹⁰⁸ *Ibid.*, 279.

¹⁰⁹ J. C. Fremont, *Memoirs of My Life*, 423.

country to the southward, and accordingly Lieutenant Abert and thirty-three men were detached for this service. They followed the Santa Fé Trail to the headwaters of the Purgatory and after crossing Raton Pass descended the Canadian River to Fort Gibson on the Arkansas.¹¹⁰

On the 16th of August, Fremont left Bent's Fort "with a well-appointed compact party of sixty; mostly experienced and self reliant men, equal to any emergency likely to occur and willing to meet it."¹¹¹ Continuing up the Arkansas to the Grand Canyon they turned northward around the Royal Gorge and returned to the river in the vicinity of Buena Vista. The stream was followed to its source and the continental divide crossed at Tennessee Pass. Descent of the western slope was made some distance along Eagle River, thence they traveled westward to and across the Colorado, across to the headwaters of the White River and down that stream to the Green.¹¹² From the upper waters of the Arkansas to the western boundary of our State Fremont's party, if not breaking a new trail, was at least the first to leave record of a traversal of this west central portion of our territory. The farther journey into California and the part played in the conquest of that region are not part of our present story, and we must therefore leave to others the recital of the further adventures of the militant explorers.

The year that marked Fremont's first expedition into the West saw an eastbound journey that deserves mention in Colorado's pre-settlement history. In the fall of 1842 Marcus Whitman began his long winter trip from Oregon to the States. Undoubtedly the assertion is greatly exaggerated

¹¹⁰ The journal of this expedition together with a map of the route appear as Sen. Ex. Doc. no. 438, 29th Congress, 1st sess.

¹¹¹ Fremont's *Memoirs*, 428. Carson, who was establishing a ranch on the Cimarron, was sent for and came immediately, bringing with him his friend and fellow scout, Richard Owen.

¹¹² See map in Fremont's *Memoirs* opposite page 120. Tennessee Pass was given no name by Fremont, although his is the first passage of this picturesque route which has come to the writer's attention. It would have been more appropriate had his name been attached to this pass rather than to the one a few miles to the northeast—one which he never crossed. The Eagle River is called by Fremont the "Piny River."

when it is claimed that "Whitman saved Oregon"¹¹³ by making this journey, but despite that fact the journey is of some concern here, inasmuch as the route taken lay through Colorado territory. Leaving the Oregon missions early in October, 1842, Whitman and Lovejoy made their way to the British fur trade post of Fort Hall (on the Snake River, present Idaho). Continuing southeastward they reached Robidoux's Fort Uintah and secured a guide for the further journey.

Fort Uncompahgre (Robidoux's Fort) on the Gunnison was reached in safety but winter had now set in in earnest and difficulties accumulated. They were evidently heading for Cochetopa Pass, but the deep snows obliterated the trail so that the guide became lost. Undaunted, Whitman returned to the post on the Gunnison, secured another guide, and in seven days was back with his companion at the foot of the mountains ready to break a trail. The storm had somewhat abated and they were now able to make slow but steady progress over the continental divide. Taos was reached in due course and after a little respite the journey was resumed. Reentering Colorado territory near the headwaters of the Purgatory, Bent's Fort was reached, and here junction was made with a party of trappers bound for the States. Be the results of this ride what they may, it was a heroic ride and a hazardous journey over the Colorado Rockies in mid-winter.

William Gilpin, who had accompanied Fremont to Oregon in 1843 was upon his return journey the following year. With Peg-leg Smith as companion he reached Fort Bridger in July, and there engaged a young Mexican as guide through the Rockies to the southeast. His exact route is not known but it probably lay in general along the path taken by Whitman during the previous winter. In the Gunnison country Indians were encountered but by judicious behavior and the distribution of a few presents he and his guide were able to continue their journey without interrup-

¹¹³ O. W. Nixon, *How Marcus Whitman Saved Oregon*. W. I. Marshall, E. G. Bourne and other historical scholars have ripped to shreds the thesis of Nixon's book. A brief narrative of the journey, written in 1876 by A. L. Lovejoy, Whitman's traveling companion, is reproduced in the appendix of Nixon's volume.

tion.¹¹⁴ After crossing the continental divide he entered for the first time the great San Luis Valley, the region whose development he was to promote in later years. Crossing the Sangre de Cristo range he turned northward to Bent's Fort and then followed the wagon road to Missouri. Upon this journey Gilpin obtained much of the information that equipped him as the delineator of Colorado's geography and resources, and the prophet of her future greatness. He also carried back to the nation's capital a ringing message of Oregon's future, and the necessity of its acquisition by the United States. His conversations with President Polk and the administrative leaders in 1845 and his reports to Congress were important factors in the expansionist policy of the next four years.¹¹⁵

Contemporary with Fremont's third expedition was the movement of five companies of the First Dragoons upon a summer tour to the Rockies. Colonel S. W. Kearny commanded the 250 men who composed this military expedition, and with Thomas Fitzpatrick as guide they left Fort Leavenworth May 18, 1845.¹¹⁶ Taking the Oregon Trail they reached South Pass and were ready to begin the return march by the first of July. Upon returning to Fort Laramie they turned southward along the regular trappers' trail—up the Chugwater and down Crow Creek to the South Platte; up the Platte and Cherry Creek to the Divide and down to the Arkansas. The trail along the Arkansas was then followed back to the States. The Dragoons had been gone but 99 days and had covered 2,200 miles of western prairies. The Plains Indians were visited and "distinctly told that the road opened by the dragoons must not be closed by the Indians, and that the white people travelling upon it must not be disturbed, either in their persons or prop-

¹¹⁴ H. H. Bancroft, *History of the Life of William Gilpin*, 26.

¹¹⁵ Ibid., 27-30. See also (U. S. Sen. Doc. 178, 29th Cong., 1st sess.) letter to Atchison dated Washington, January 23, 1846, favoring a mail line from Missouri to Oregon. He recommends the route by the head of the Arkansas River.

¹¹⁶ *Report of a Summer Campaign to the Rocky Mountains, etc.*, in 1845, by S. W. Kearny, in Sen. Ex. Doc. no. 1, 29th Cong., 1st sess., p. 210-13.

erty.”¹¹⁷ This was the largest body of United States troops that up to this time had traversed territory of Colorado. The expedition was conducted with marked success and the purpose of impressing the Indians with the strength and ability of the government’s military arm was accomplished.

In the spring of 1846 the young historian, Francis Parkman, left St. Louis on what he called “a tour of curiosity and amusement to the Rocky Mountains.”¹¹⁸ He followed the Oregon Trail to Fort Laramie, and after visiting the Indians and hunting in the mountains in that vicinity he turned southward into Colorado territory. His route through our state was practically that taken by Colonel Kearny and his dragoons the year before. Upon passing up the South Platte River the setting of a previously active fur trade life was passed; but already the scene had changed, the actors had gone, and the forts were “now abandoned and fast falling into ruin.”¹¹⁹ The Pueblo fort on the Arkansas, however, was occupied, and here the traveler and his companions were entertained in the adobe enclosure. The little fields of corn and plots of vegetables were a pleasing sight, and the fruits of this pioneer agriculture made welcome additions to their bill of fare. They continued down the river to Bent’s Fort and returned to the States.

On January 1, 1847, George F. Ruxton, a young Englishman who has left an interesting account of his travels, left Taos for the United States. Ascending the Rio Grande he entered Colorado territory in the San Luis Valley, and turning eastward crossed the mountain range at Sangre de Cristo Pass. Upon descending the Huerfano and crossing to the Greenhorn he came upon a little settlement of American and French Canadian trappers whom the decline of the fur trade had forced into other pursuits.¹²⁰ Corn had been

¹¹⁷ *Ibid.*, 211. Colonel Kearny suggested that such a military expedition be sent into the West every two or three years to impress the Indians and recommended this in preference to the establishment of military forts in the West.

¹¹⁸ F. Parkman, *The California and Oregon Trail* (A. L. Burt Co. edition), 5.

¹¹⁹ *Ibid.*, 251.

¹²⁰ G. F. Ruxton, *Adventures in Mexico and the Rocky Mountains*, 221.

raised in the valley during the preceding season. At the Pueblo on the Arkansas the ex-trapper, John Hawkens, provided accommodations and here the traveler took up headquarters, spending the remainder of the winter making hunting expeditions up Fountain Creek and into South Park. Early in May he turned homeward, traveling from Bent's Fort eastward in company with the wagons of the United States commissariat.

In the year 1846 the United States became involved in a war with Mexico over the annexation of Texas and the question of boundaries. One of the features in the general plan of war was a campaign directed against New Mexico and California. Colonel S. W. Kearny, who had led the First Dragoons to the Rocky Mountains during the previous summer, was chosen to lead the "Army of the West." The conquest of New Mexico was undertaken primarily for the sake of the American traders, but also with a view to the permanent retention of the province.¹²¹

The call for volunteers came in May, and in June over 1,600 men were assembled at Fort Leavenworth, ready for the march. The army was detached in sections, and along the well beaten Santa Fé trail the infantry and dragoons made their way, while a great caravan of 1,500 wagons with about 15,000 oxen and 4,000 mules carried the supplies, ammunition and field pieces.¹²² Taking the mountain division of the Santa Fé Trail they reached a rendezvous about nine miles below Bent's Fort on the Arkansas near the end of July. Here, near the site of present Las Animas, the Army of the West congregated while plans were perfected for the acquisition of Santa Fé. Bent's Fort was converted into a military storehouse and hospital. Thus, in part of present Colorado shelter for men and forage for animals were provided for the army that was to win for our country the major part of the territory of our State—land which previously had been foreign soil.

¹²¹ Justin H. Smith, *The War with Mexico*, I, 286.

¹²² Ibid., 515, footnote. General Sterling Price and his regiment were organized and mustered into the service at about the time that Kearny set out from Bent's Fort for Santa Fe. A battalion was raised from the Mormons at Council Bluffs, Iowa, and these also followed Kearny's advance army into the Southwest.

Governor Armijo, the crafty but cowardly commandante at Santa Fé, made a show of resistance, but his forces dissolved before the American advance. The occupation of Santa Fé was effected with but little difficulty on August 18th, and soon General Kearny—whose commission as brigadier general had overtaken him—had a provisional government established under Charles Bent as governor.¹²³ There was practically no resistance from the New Mexicans, many of them welcoming American rule as an escape from previous official graft and tax exactions and as a guarantee for better trade relations. However, some of the surrounding Indian tribes, accustomed to preying at will upon the Mexican settlements, gave some cause for uneasiness.

Shortly after departing for California, General Kearny learned of Navajo depredations and sent back orders for a campaign against the marauders. One branch of this expedition is of interest in Colorado history inasmuch as it came to the southern part of Colorado and was led by Major Gilpin, who fifteen years later was to reenter Colorado as its first chief executive. With two companies of Colonel Doniphan's Missouri Regiment, Major Gilpin was ordered to Abiquiu about the middle of September. With a part of his men he continued northward into our San Luis Valley, there met the Utes and induced sixty of their principal men to accompany him to Santa Fé and to enter into treaty relations with Colonel Doniphan (October 13, 1846). Some time after returning to Abiquiu, Gilpin received orders to march against the Navajos.

With men poorly clothed and equipped he set out on November 22d upon a terrible winter campaign into the mountains. Following the Chama River to its source, he crossed over the continental divide and descended to the San Juan in southern Colorado. In the account of the expedition this march is compared to that of Hannibal over the

¹²³ Lieutenant W. H. Emory of the Topographical Engineers, with Lieutenants Warner, Abert, and Peck were attached to Kearny's army as field and topographical engineers. Emory's notes upon the expedition are very valuable source material. They appear in U. S. House Ex. Doc. no. 41, 30th Congress, 1st sess. In this document also are valuable notes by J. W. Abert, P. St. George Cooke, and A. R. Johnston.

Appennines and of Bonaparte over the Alps.¹²⁴ The great difficulties of the expedition were those incident to mountain travel in winter for Indian opposition was not encountered. In the meantime Colonel Sterling Price with over 1,200 new Missouri volunteers and a battalion of Mormon soldiers had arrived at New Mexico. Upon the departure of Colonel Doniphan for Chihuahua Colonel Price remained in charge of the military in New Mexico.¹²⁵ The further campaigns of the War with Mexico do not here concern us, while the results of the conflict as they affect Colorado will be treated subsequently.

Shortly after his return to Missouri in the summer of 1847, Major Gilpin was called upon by Governor Edwards to raise a force to punish the Indians who had been committing depredations along the Santa Fé Trail. This was done accordingly, and on October 4, 1847, with a force of about 850 men, Gilpin (now Lieutenant-colonel) led his punitive expedition towards the plains.¹²⁶ At Fort Mann (on the Santa Fé Trail crossing of the Arkansas) his infantry were garrisoned, while with the two cavalry companies he moved on up the Arkansas to the vicinity of Pueblo where he took up winter quarters. One object of this move was to prevent the union of the Cheyennes and Arapahoes with the Comanches, Pawnees and other tribes that had committed the

¹²⁴ John T. Hughes, *Doniphan's Expedition*, 67. Hughes did not accompany the Gilpin detachment and so did not write at first hand. He acknowledges in his preface the assistance of Gilpin and others in furnishing data. In fact I am convinced that the major part of Chapter X was written by Gilpin. The high-sounding phraseology is distinctly typical and characteristic of Gilpin's writing.

¹²⁵ A number of the Mormons were accompanied by their families. Some of the men were disabled through sickness and it was determined to send these, together with the women and children to winter near Pueblo on the Arkansas. This was accordingly done, and a temporary settlement was built a little below the Pueblo fort. This was the first American settlement of such size in Colorado (about 86 men, 25 women, and a large number of children), but it was temporary, since almost all of the Mormons continued on to Utah the following year. See Captain Cooke's Report in House Ex. Doc. no. 41, 30th Congress, 1st sess., p. 551. Also, Tyler's *History of the Mormon Battalion*.

¹²⁶ H. H. Bancroft, *History of the Life of William Gilpin*, 38.

depredations along the New Mexico road. This object was effected and in March, 1848, he moved southward to the settlements in the Mora valley (New Mexico) to obtain additional supplies. A rather vigorous campaign was now conducted against the Comanches and Apaches in present northeastern New Mexico and southwestern Kansas. Various bands were dispersed and about 250 Indians killed.¹²⁷ After a year's service on the plains the troops returned to Fort Leavenworth, and were commended by the Secretary of War for the service performed.

In 1848 Fremont set out upon his disastrous fourth expedition. Although he had resigned from the army he had not given up western exploration, and now that the Pacific railway question was being agitated he was thought of as the logical explorer. St. Louis was especially interested in the railroad project, and it was here that the required funds were raised and the expedition was organized; Senator Benton, Robert Campbell, and others being the chief supporters of the undertaking. A winter journey was planned, since "that was the season in which to see all the disadvantages of his route."¹²⁸ With a party of thirty-three men and over one hundred mules the expedition made its way up the Kansas River and its Smoky Hill branch and then turned to the Arkansas. Reaching Bent's Fort November 17th, final arrangements were made for the mountain journey. Snow already covered the plains and lay deep in the mountains, but despite the warnings of trappers and Indians, Fremont determined to go on. With 130 bushels of shelled corn he expected to supplement the feed found en route and thus to get his mules over the mountains successfully. At Pueblo the old trapper, Bill Williams, was engaged as guide and the party moved up the Wet Mountain Valley and over the Sangre de Cristo range. This was a high range and a difficult crossing, but the higher mountains of the continental divide yet lay ahead.

Instead of taking the practical Cochetopa Pass, the promising opening of the upper Rio Grande Valley was

¹²⁷ *Ibid.*, 41. See report of Col. Gilpin in House Ex. Doc. 1, 30th Congress, 2nd sess., p. 136-155.

¹²⁸ Benton's *Thirty Years' View*, II, 719.

chosen. This was a fatal mistake which led them into country practically impassable in winter.¹²⁹ Difficulties accumulated as they pushed westward up the valley, for the snow grew ever deeper and the cold more intense; but with fatal resolution they pushed on. Fremont writes:

We pressed up toward the summit, the snow deepening; and in four or five days reached the naked ridges which lie above the timbered country, and which form the dividing grounds between the waters of the Atlantic and Pacific oceans. . . . Meanwhile it snowed steadily. The next day we made mauls, and beating a road or trench through the snow crossed the crest in defiance of the *pouderie*, and encamped immediately below in the edge of the timber. The trail showed as if a defeated party had passed by; pack-saddles and packs, scattered articles of clothing, and dead mules strewed along. A continuance of stormy weather paralyzed all movement. We were encamped somewhere about 12,000 feet above the sea. Westward, the country was buried in deep snow. It was impossible to advance and to turn back was equally impracticable. . . . I determined to recross the mountain more towards the open country, and haul or pack the baggage (by men) down to the Del Norte. With great labor the baggage was transported across the crest to the head springs of a little stream leading to the main river. A few days were sufficient to destroy our fine band of mules. They generally kept huddled together, and as they froze, one would be seen to tumble down and the snow would cover him.¹³⁰

On the day after Christmas a party of four men was sent toward the New Mexican settlements for succor. As

¹²⁹ Fremont places the blame for this choice upon the guide Bill Williams. In a letter to his wife written January 27, 1849 (Bigelow's *Life of Fremont*, 365) he says of him: "The error of our journey was committed in engaging this man." But Fremont had written to Benton from Bent's Fort November 17, 1848, that he intended to "ascend the Del Norte to its head and descend on to the Colorado." This was written before Williams was employed as guide; and would indicate that the route followed was Fremont's rather than Williams' choice. Fremont had crossed the Sierra Nevadas in winter when he had been told that it could not be done. Having accomplished the impossible previously he was inclined to launch forth, turning a deaf ear to cautions and fears. Williams can be more fairly criticized for his failure to lead to Taos the party seeking relief than for guiding the main party into the San Juan Mountains.

¹³⁰ Bigelow's *Life of Fremont*, 367-8 (Letter of Fremont to his wife, dated at Taos, January 27, 1849).

the days passed and no news of help came the spirits of the men remaining sank lower and lower. After sixteen days of waiting Fremont took four of the men and set out for help. On the fifth day out they encountered some Indians and got a little help. On the next day, near the southern end of the San Luis Valley they came upon the party which had gone for assistance twenty-two days before. One of the four had died and the others were apparently lost. They were starving and had resorted to cannibalism. With the help of the Indians' ponies these two advance parties reached the New Mexico settlements in safety. A relief expedition was immediately formed and with it returned Fremont's faithful scout, Godey, to rescue his companions. The sufferings of those left behind had been terrible, but we cannot here recite the details of the tragedy. Suffice it to say that of the thirty-three men who faced the San Juan mountains with Fremont in December, eleven remained asleep under the snowy blanket.¹³¹ Thus was the explorer baffled, the toll of discovery exacted, and one of the great tragedies of Colorado's history written upon the map of the Rockies. Fremont, balked but not defeated, reformed his party at Taos and choosing a more southern route continued to the Pacific Coast.

The year 1849 saw the great rush of the Argonauts to California. Although most of these gold seekers took trails to the north or to the south of Colorado, there were many who crossed our State. Parties from the Southern States often came up the Arkansas to the vicinity of Pueblo and then turned northward to the South Platte and on to the Oregon Trail. Space would not permit enumeration and description of these various expeditions even were the data available. Most of them did not affect Colorado, but there were a few of these prospectors who picked up "color" in our territory and returned nine years later to inaugurate the stampede to Pikes Peak.

Fremont's search for a railroad route to the Pacific

¹³¹ More of the details of the tragedy are related in the journal of Micajah McGehee, a member of the party. See the *Century Magazine*, XIX N. S., 771; also *Outdoor Life*, August, 1909, and May, 1910.

in 1848 was neither the beginning nor the end of that important movement. Since the thirties the proposal for a trans-continental railroad had been agitated. Various schemes had been presented to Congress by Asa Whitney and others but no proposition received Congressional sanction. The acquisition of the Mexican session and the settlement of the Oregon boundary promoted the Pacific railroad scheme, and then with the gold discovery in California and the consequent rush to the western coast an additional incentive was provided for a coast-to-coast railway. In the railroad discussions it became evident that insufficient knowledge upon possible routes was available for an intelligent decision and it was accordingly determined to place exploring parties in the field for the survey of possible routes. To the Secretary of War, Jefferson Davis, was given the authority to select the routes to be surveyed, and under his instructions four parties were put into the field to explore as many routes.¹³² But one of the designated lines crossed Colorado—that known as the "Central route," which was to follow as near as might be to the 38th parallel of north latitude. Captain J. W. Gunnison¹³³ was selected to head this exploring party and early in June, 1853, he was in St. Louis making preparations.

Eight assigned men, besides the teamsters and employees, made up the party of Captain Gunnison, and these were escorted by thirty men of the regiment of Mounted Riflemen. Eighteen wagons carried the equipment and supplies and it was intended that their passage over the route would test to some degree, the practicability of the road. Following the Santa Fé Trail, Bent's Fort (now in ruins) was reached late in July. Up the Apishapa and then the Huerfano they traveled and crossed the first range at Sangre de Cristo Pass. It was with difficulty that the wagons of their train were conducted over this trail, but the feat was finally accomplished and the party descended into the San

¹³² Pacific Railroad Reports in Sen. Ex. Doc. no. 78, 33d Cong., 2d sess., parts 1-11. Also, G. L. Albright, *Official Explorations for Pacific Railroads, 1853-1855*.

¹³³ Gunnison had accompanied Captain Stansbury in his exploration to and in Utah in 1849-1850 and had written an interesting book upon the Mormons.

Luis Valley to recoup at Fort Massachusetts (the first military fort established in Colorado territory, 1852).

Lieutenant Beckwith made a side trip to Taos and secured the services of Antoine Leroux as guide through the country to the westward. Reconnaissances were made of Robidoux's Pass (Mosca) and William's or Sand Hill Pass by Gunnison. Continuing through the northern part of the San Luis Valley (which they called "Homan's Park" in honor of their astronomer) they explored Poncha Pass (which Beckwith named "Gunnison Pass"). But the route selected for the further journey was over the Cochetopa Pass and to the Gunnison (by them called the Grand River). Although the Cochetopa is the most feasible pass leading to the western slope in this vicinity, it was judged by Gunnison as impracticable for a railroad route unless a tunnel of at least two miles length were constructed.¹³⁴ Down the valley of the Gunnison the party moved, but found many obstacles to railroad construction. Some distance below our town of Grand Junction the Old Spanish Trail was intercepted and along this trace the party continued into Utah. On the Sevier River in west central Utah Captain Gunnison and a number of his party were killed by Indians, and the further exploratory work fell to Lieutenant Beckwith.

The route taken by Gunnison through Colorado territory in 1853 was pursued during the same year by two other expeditions. These were led by Lieutenant E. F. Beale and by J. C. Fremont respectively; the former preceding and the latter following the Gunnison expedition. Beale was in the midst of his interesting career and was on his way to California to become Indian agent on the coast.¹³⁵ An interesting account of the journey of the Beale party was written by G. H. Heap.¹³⁶ Although preceding Gunnison across southern Colorado they were not trail breakers, for the route was already a well known trail to the Indians and to

¹³⁴ Pacific Railroad Reports, II, 48.

¹³⁵ S. Bonsal, *Edward Fitzgerald Beale*. Beale had been the companion scout with Kit Carson in obtaining help for Kearny's men at the Battle of San Pasqual (California) in 1847.

¹³⁶ G. H. Heap, *The Central Route*.

the New Mexicans. And the name of the pass crossed—Cochetopa (Ute word for "Pass of the Buffaloes")—indicates that the real discoverers of the route were the early buffaloes that roamed the region.

Fremont's fifth and last western expedition was undertaken in an effort to complete the work begun by his disastrous winter expedition of 1848-9. Fremont and his friends were disappointed when the "Pathfinder" was not chosen to lead the expedition for the exploration of the Central Route in which Fremont and Senator Benton were so much interested. After Gunnison had been chosen to lead the government party, Fremont and his friends decided upon a private expedition. Inasmuch as it followed the route of Beale and of Gunnison we shall not discuss it here.¹³⁷

A number of minor expeditions entered Colorado territory during the early fifties, but were of little consequence.¹³⁸ In 1851 Captain J. Pope of the Topographical Engineers, crossed a part of our territory on an expedition from Santa Fé to Fort Leavenworth. Striking the Arkansas at the Big Timbers, he crossed northward to the headwaters of the Smoky Hill and continued eastward down this stream.¹³⁹ Another party of Topographical Engineers under Lieutenant F. T. Bryan made a reconnaissance from Fort Riley, Kansas, to Bent's New Fort in 1855. This same year Lieutenant J. C. Amory made a similar journey from Fort Gibson to Bent's Fort.¹⁴⁰

¹³⁷ S. N. Carvalho, *Incidents of Travel*. Carvalho was the artist of this expedition.

¹³⁸ Captain Stansbury, after exploring and surveying in Utah returned eastward in 1850 over a route that was to have taken him through a part of Colorado. From Fort Bridger he was led across southern Wyoming, quite some distance to the south of the Oregon Trail, by the old scout Jim Bridger. After crossing Bridger's Pass and the North Platte they rounded the Medicine Bow Mountains and were to continue southeastward along the Cherokee Trail (called by Stansbury the "Evans' Trace"), when the Captain was accidentally hurt and had to turn to Fort Laramie for medical help and change his plans. Gunnison was with Stansbury on this expedition. See H. Stansbury, *Exploration and Survey of the Valley of the Great Salt Lake*.

¹³⁹ G. K. Warren, "Memoir to accompany the Map of the Territories of the United States" (Pacific Railroad Reports, vol. XI), p. 60.

¹⁴⁰ *Ibid.*, 83.

During the early fifties there were a number of military expeditions directed against the Indians of the Plains. One of the most prominent of these was led by Colonel J. B. Sanborn in 1852. Proceeding along the Santa Fé Trail and up the Arkansas he reached Pueblo; then turning northward he crossed the Divide, descended Cherry Creek and the South Platte and continued on to Fort Laramie. No noteworthy incidents occurred on the way.¹⁴¹ Though small bodies of troops during the fifties passed back and forth between Fort Laramie, the New Mexican forts, and Utah, most of these have no historic interest. However, the expedition of Captain Marcy over the Colorado Rockies in the winter of 1857-8 deserves attention.

Colonel A. S. Johnston and his army operating against the Mormons found themselves at Fort Bridger in November, 1857, with insufficient provisions. It was decided to send a company to Fort Union, New Mexico, for additional supplies. Captain R. B. Marcy was chosen to lead this expedition and with forty enlisted men, twenty-five mountain men, packers and guides he set out in six inches of snow on November 24, 1857. Thirty days' provisions were taken and sixty-six mules provided the means of transportation. Jim Baker and Tim Goodell, experienced mountain men, were to act as guides and interpreters.

A trappers' trail was taken in a generally southern direction and all went well so far as the Gunnison River. As they proceeded up this stream the snow became deeper and deeper. When it reached a depth of four feet the order of march was changed, the men advancing in single file to break trail for the animals. With pine needles only for subsistence the mules grew weak and began to die. Burdens were lightened by caching much of the luggage, but progress was slow and difficult. Supplies were nearing exhaustion and rations were accordingly reduced. For twelve days the men lived on starved mules and when the salt was exhausted gunpowder was sprinkled on the mule steaks. Want of tobacco was one of the hardest privations. On the evening of January 1, 1858, Captain Marcy wrote in his journal: "We have been engaged since daylight

¹⁴¹ J. C. Smiley, *History of Colorado*, 159.

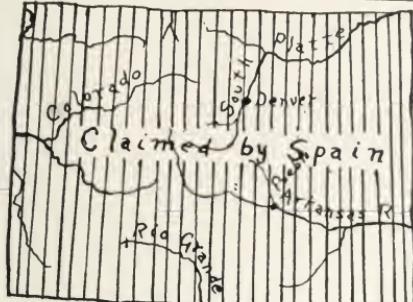
this morning in wallowing through snow at least five feet deep, and have only succeeded, by the severest toil, in making about two miles during the day. From our bivouac of tonight we can see the fires of last night."¹⁴² Shoes wore out and men wrapped their feet in blankets and pieces of their coat tails. After having been lost from the proper course for some time, the summit was finally reached and two men on the strongest remaining mules were sent ahead towards Fort Massachusetts for help.

On the eleventh day thereafter, supplies from the fort reached the main party and all the men were saved. Fort Union was reached in safety and on March 15th the return trip was begun over an easier route. Going northward, the Arkansas was reached, and a camp established on Fountain Creek, where reenforcements were awaited. On April 30th the march was resumed. While encamped on the Divide early in May, an extraordinary incident occurred. A severe blizzard came on and continued for sixty hours with unabated fury. Three hundred of their horses and mules stampeded with the wind and ran for nearly fifty miles. Two men and numbers of the cattle perished in the storm. After the storm passed, the animals were gathered and the march continued, Fort Bridger being reached on June 9, 1858.

SUCCESSIVE POLITICAL JURISDICTIONS

Before closing the story of Colorado's pre-gold-rush days, some attention should be given to the varying political authorities that have claimed, owned or acquired the territory that now comprises our State. The story is portrayed by the series of small sketch maps shown on the opposite page. During the early period of European expansion in the New World few definite dates and boundaries can be accurately applied to American dominions. Spain being the pioneer colonizer made good though extensive claims to territory. From the time of Coronado's expedition the whole western interior of North America was claimed by Spain; and when France, toward the end of the following century, expanded into the Mississippi basin a competitor

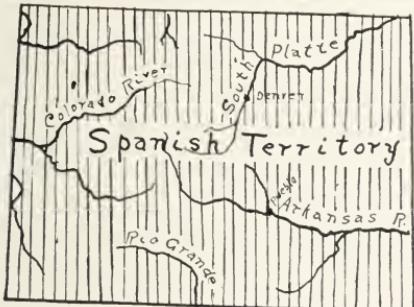
¹⁴² R. B. Marcy, *Thirty Years of Army Life on the Border*, 235.



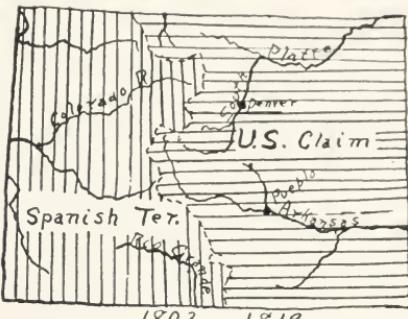
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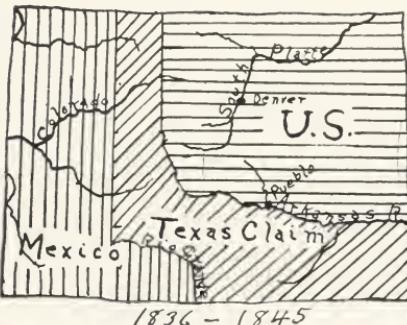
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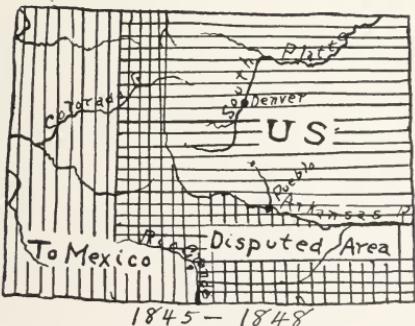
1803 - 1819



1819 - 1836



1836 - 1845



1845 - 1848



Since 1848

SUCCESSIVE JURISDICTIONS OVER COLORADO TERRITORY

for the first time appeared on the horizon of Spain's territory.

France made claims to the whole Mississippi basin, and thus a tentative international boundary was drawn along the crest of the Colorado Rockies. The sojourn of France in the New World was brief; but when she was pushed out by England she ceded her territory west of the Mississippi River to Spain in order to avoid giving it to her more formidable enemy, England. Thus all of Colorado was unquestionable Spanish territory from 1763 to 1800. Napoleon forced a recession of the Louisiana Territory from Spain to France in 1800 and three years later sold the immense and valuable region to the United States. Thus the original French claim, including Eastern Colorado, came under the Stars and Stripes; but the boundary was a matter of dispute until fixed by the treaty of 1819. This treaty with Spain gave to the United States that portion of Colorado lying north of the Arkansas River and east of the meridian of its source.¹⁴³ The region south of the Arkansas and east of the continental divide (though previously claimed by the United States) was thus acknowledged as Spanish territory.

In 1821 Spain lost her territory in North America by the successful revolt of Mexico under Iturbide, and Western and Southern Colorado thus came under a new flag. During the nine years of Texan independence (1836-45) a tongue of territory extending through southeastern and central Colorado was claimed by the "Lone Star State"; and when this ephemeral Republic joined the galaxy of states to the northward her claim to territory became an important factor in causing the War with Mexico. With this Mexican War was written the last chapter of the political acquisition of Colorado territory. When General Kearny and his Army of the West marched into Santa Fé in August, 1846, western Colorado territory became United States soil, *de facto*. Then in February, 1848, when the treaty of Guadalupe Hidalgo was signed, Mexican claims were forever renounced and a potential empire was added to the Union. Portions of Colo-

¹⁴³ T. M. Marshall's *A History of the Western Boundary of the Louisiana Purchase* is a good treatment of this subject.

rado territory had thus passed under the jurisdiction of four nations—Spain, France, Mexico and Texas—before she came securely under the wing of the great American Eagle.

CHAPTER VII

THE COLORADO INDIANS

By A. J. Fynn

ETHNIC CHARACTERISTICS AND GENERAL DISTRIBUTION OF THESE INDIANS WITHIN THE HISTORIC PERIOD—EARLY PEACEFUL RELATIONSHIP WITH WHITE OCCUPANTS—CIRCUMSTANCES LEADING TO DISCORD BETWEEN THE TWO RACES—EXCEPTIONAL EVENTS AT SAND CREEK—SPECTACULAR BATTLE ON THE ARI-KAREE—PHILANTHROPY AND TRAGEDY IN THE MOUNTAINS—THE THORNBURG AMBUSH—DEATH AND CAPTIVITY AT THE WHITE RIVER AGENCY—FINAL DISPOSITION OF THE NATIVE MOUNTAINEERS—WHAT THE FUTURE HAS EVIDENTLY IN STORE FOR THIS RACE.

When white men first visited the shores of North America, the greater portion of the region which now comprises the United States was occupied by a half dozen large Indian linguistic stocks, or families. Of that whole region, the area which, today, is known as the State of Colorado was held principally by branches of two of these. A stock, or family, as here understood, includes a certain number of natives, scattered over a more or less loosely defined portion of country, who exhibit analogies enough in oral communication to justify a presumption of single origin. In this process of classification—the collecting of material and establishing of evidences—the main source of information and proof is found in the vocabulary. Other elements in speech-creating are considered of comparatively little importance. “It therefore becomes necessary in the classification of Indian languages into families to neglect grammatic structure, and to consider lexical elements only.”¹ It is, of course, obvious that the divisions of a

¹ J. W. Powell, *Seventh Annual Report of the Bureau of Ethnology*, 11.

linguistic family, when scattered over a large and diversified region, must present marked differences in the use of everyday speech, although the root elements may show by analysis an indisputable relationship to one another. It is not uncommon to find two tribes belonging to the same stock, unable to understand each other, when separated by widely intervening lands. For instance, nobody would be surprised to find among the half hundred widely separated tribes of the Athapascan stock an impossibility of speech comprehension between one of those tribes living in Alaska and another in New Mexico.

Colorado, as already noted, was held in possession by practically two of the larger of these. The Shoshoneans overran a wide oblique strip of country extending approximately from the mouth of the Columbia River to that of the Mississippi. Within the present State of Colorado, they occupied all the mountains and a larger part of the southern plains. The northeastern portion of the State was held by the Algonquian tribes.

While the acquisition of clothing and weapons is always an important factor in primitive life—varying much according to climate and incidental circumstances—the food-quest is always paramount. The struggle for daily sustenance, therefore, was a never ceasing cause of contention between the natives of the mountains and those of the plains. The wild beasts and birds of the various highlands, from the innumerable beaver colonies of the foot-hills, upward along the irregular terraces among the homes and haunts of deer and ptarmigan to the mountain sheep, grazing on their rugged pasture lands far above timberline, attracted, on account of flesh or fur, the nomads of the plains. Various salt springs in the natural mountain meadow lands drew hostile hordes of men and beasts into conflict. Numerous hot fountains and streams, the curative properties of which the natives were familiar with, caused many unpleasant contentions, and often, on account of superstitious notions, led to very serious results. In the setting up of tepees the plains Indians required poles, and, in going into elevated woodlands to obtain them, these non-forest visitors brought on bloody encounters with the more permanent occupants. Again, the heat of the plains in

summer drove many to the mountains; and the grazing fields, especially of South Park, were a further source of bitter contentions.

While the Shoshonean and Algonquin stocks held possession of most of Colorado territory, the northern border was, more or less, overrun by the famous Siouan stock,² the most populous linguistic family north of Mexico, with the exception of the Algonquins. Moving up and down the rivers in the vicinity of the Great Lakes, they gradually drifted westward over the prairies and the plains to the foot of the Rocky Mountains.

Of all the North American Indians, these stand out as probably the most typical. They were accomplished warriors and hunters, the two greatest essentials of primitive American activities. The very nature of the country over which they roamed tended to develop in them a strikingly splendid physique. They were tall, slim, and graceful, like the antelope they hunted. They fought against bands of their own race or against trained regiments of the whites with equal proficiency. Like other Indians of the plains, they were expert horseback riders and were efficient with the rifle. In many ways these peerless occupants of the piedmont region might be interestingly compared with the Iroquoian nation of the Atlantic seaboard.

A more distinctly Colorado component was the body of Cheyennes and Arapahoes who were typical representatives of the populous Eastern Algonquins. For more than a century, in their far western wanderings, the two branches had been closely associated, and they continued to grow still more coöperative when confronted by the gradually increasing groups of whites.

The Arapahoes ranged over the plains bordering the mountains and extending in a general way from the Cache la Poudre to the Arkansas. At the junction of the

² "The recognized southern boundary of their country was the North Platte River, but on account of their friendly relations with the Cheyennes and Arapahoes, the Sioux often wandered along the base of the mountains as far as the Arkansas River, and, being at enmity with the Utes, they frequently joined the Cheyennes and Arapahoes in raids upon their common enemy."—I. Howbert, *Indians of the Pike's Peak Region*, 18.

South Platte River and Cherry Creek, they loved to congregate, and great bands of them were constantly encamping on the site now covered by the City of Denver.

The Cheyennes, before they were driven across the plains by the Sioux, had occupied a portion of Minnesota country in the vicinity of the sources of the Mississippi River. While in and around the Black Hills they became leagued closely with the Arapahoes, and, after that, vicissitudes of one of these great branches of Western natives came to be practically the vicissitudes of the other. As occasion required, however, they confederated temporarily with other neighboring tribes. "For sixty years the Cheyennes and Arapahoes have been the firmest friends, occupying the same country, living in the same camps, making peace or war with the same enemies at the same time, and conducting themselves in everything (except inter-marriages) as if they were one and the same tribe. The children play, fight, hunt and constantly associate together, yet not one in ten of the men, women, or children of either tribe can hold even the most ordinary conversation in the language of the other."³

In the trapper-day period of Western history a large number of Cheyennes moved down upon the Arkansas, leaving the remainder of their people upon the lands inclosing the headwaters of the North Platte and the Yellowstone. Twenty years later, by the treaty of Fort Laramie, in 1851, this separation became permanent; and the two divisions came to be known respectively as the Northern and the Southern Cheyennes. While this arrangement gave to the bands some advantages in the way of gathering and disposing of furs—as, for instance, proximity to Fort Bent—nevertheless, the strength of the tribal organization was very much weakened by it.

This move also brought the Southern branch into bloody conflict with strong belligerent neighboring native tribes that roamed about among the tributaries of the Arkansas.

The wide and wild Western plains naturally encouraged extensive migrations of Indian groups. In addition to that, new bands were constantly being formed, others dis-

³ Dodge, *Our Wild Indians*, 46.

rupted, new alliances made, and usurpations with all their accompanying tragedies were ever in evidence.

Among the long-distance migrations of restless native groups was that of the Kiowas, driven southward from their pristine homes among the headwaters of the Missouri and Yellowstone. They finally took possession of a large area out on the Arkansas River. Even before their long migration, they made trips down into New Mexico to steal horses. Their arrival brought on immediate conflicts with the Comanches, with whom they finally confederated, and then waged war, at first with people of their own blood and later with white occupants of settlements on the plains of Texas, and with odds and ends of various races and nationalities upon the borderlands of Mexico. They seem to have established themselves rather securely upon the banks of the Arkansas and the Canadian rivers in the earlier part of the nineteenth century. "Among all the prairie tribes they were noted as the most predatory and bloodthirsty, and have probably killed more white men in proportion to their numbers than any of the others."⁴

They were nearer the tropical belt, and hence noticeably dark and heavily built, lacking the grace and natural attractiveness of the Sioux and other natives on the more northern zones. The Kiowas seem to be one of the smaller distinct stocks scattered over the United States; though they have always been closely associated with the Shoshoneans, and a few authorities think them a branch of that well-known and far-extended family.

In the southeastern corner of the State ranged the Comanches, a large branch of the Shoshonean stock, with territory extending on over a large part of the immense Texan lands. Like the other occupants of the plains and prairies in general, they had yielded to the pressure of the Sioux, and, after holding their ground among the Black Hills for awhile, were forced southward by the Kiowas. In the early part of the eighteenth century, they ranged over that portion of Colorado lying between the headwaters of the Kansas and the various branches of the

⁴ James Mooney in *Handbook of American Ethnology*, Part I, 699.

Platte, but, before the dawn of the nineteenth century, hostile tribes farther north had forced them to the south of the Arkansas, where they were firmly established when the white explorers first appeared west of the Mississippi River. Being members of the same stock, they appeared to be on friendly terms with the Utes when both first appeared in this section, but the differences of habitat brought about that deadly enmity which became a settled policy between the occupants of the mountains and those of the plains. This ancient hatred, between the arboreal Shoshones and the campestral Comanches, was so intense, and so especially noticeable—since both were of the same linguistic stock—that in the course of time a popular legend grew up in explanation of it.⁵

The event is recorded as taking place, very appropriately, at Manitou Springs, which lie within an enchanted nook at the foot of Pike's Peak. Towering mountain chains surround this narrow corner of earth, except to the east, where a passage gradually spreads outward upon the plains. In the center of this inviting recess is the group of hissing bubbling mineral waters that so deeply stirred the reverence and superstition of all the constantly visiting natives of the surrounding country.

Hundreds of years ago, the story runs, when the Indians pursued, peacefully together, the buffalo on the plains, and spoke a common dialect, two hunters, one successful and the other unsuccessful, but both utterly exhausted by traveling, came to the banks of the Fountain, where it passes outward in a southeastwardly direction to join the larger watercourses on the plains. Following the stream upward for a short distance, a crystal spring was found, at which the successful hunter quenched his thirst, while the other drank from the uncleanly flowing waters of the channel.

The man at the spring raised in the hollow of his hand a little water, held it toward the sun and then sprinkled it on the ground as an offering to the Great Spirit—a very simple and common form of worship signally associated

⁵ The legend is quoted in Howbert's *Indians of the Pike's Peak Region*, 38 et seq.; also in Hall's *History of Colorado*, and elsewhere.

with the famous waters of that place. The other, disappointed in the result of the recent hunt, acutely mindful of the success of his companion, conscious of his neglect in paying due respect to the presiding Spirit of the Springs, and wrathful over the commendable decorum of his fellow-traveler, provoked a dispute by accusing him of unfairness in drinking from the spring while he had to content himself with the defiled waters below. The broader-minded peace-seeking Shoshonean replied in vindication of himself that the spring waters were for man, the stream waters for beasts, and that Shoshone and Comanche in common, with all others of the race, were given the privilege of drinking at the fountain head. Claiming the Comanche nation to be superior to the Shoshone, the quarrelsome one held that the places of the drinkers should have been reversed while partaking of the water. The other emphasized his contention by declaring that, "When the Manitou made his children, whether Shoshone or Comanche, Arapahoe, Shian, or Pané, he gave them buffalo to eat, and the pure water of the fountain to quench their thirst. He said not to one, 'Drink here,' and to another, 'Drink there'; but gave the crystal spring to all, that all might drink."⁶ As he finished speaking, he bent over the spring to drink, when the Comanche, too unskilled for reply and maddened with jealousy, leaped upon his kneeling companion and thrust his head down into the bubbling water, holding it there till life was extinct.

No sooner was this accomplished than the murderer was seized with remorse. Half crazed with the thought of what he had done, he drew the head from the spring, and, to his amazement, the hissing noise of escaping gas followed as if reproaching the perpetrator of the tragedy. "A thin vapoury cloud arose, and gradually dissolving, displayed to the eyes of the trembling murderer the figure of an aged Indian, whose long, snowy hair and venerable beard, blown aside by a gentle air from his breast, discovered the well-known totem of the great Wan-kan-agá, the father of the Comanche and Shoshone nation, whom the tradition of the tribe, handed down by skillful hieroglyphics, almost deified

⁶ Howbert's *Indians of the Pike's Peak Region*, 40.

for the good actions and deeds of bravery this famous warrior had performed when on earth.”⁷

Accusing the Comanche of severing the friendship of the Indians of the two sections, the great Wan-kan-aga raised his war club, and killed the murderer, who fell into the spring—from which, since that time, a peculiar odor and taste have issued.

The just Wan-kan-aga, desiring to perpetuate the memory of the honorable warrior, moved up the stream for a short distance to a hard flat rock, constituting a part of the bank of the stream, and this he struck with his club. His blow produced a basin in the rock which immediately filled with clear bubbling water, which continued from that time forth. “Thus the two springs remain, an everlasting memento of the foul murder of the brave Shoshone, and the stern justice of the good Wan-kan-aga; and from that day the two mighty tribes of the Shoshone and the Comanche have remained severed and apart.”⁸

The prevailing opinion seems to be that the spring first referred to is the one manipulated by the Manitou Bottling Company of today, and the other the popular soda spring above.

This tendency to hostility between the occupants of the forested highlands and the sun-parched plains naturally suggests itself to the ordinary reflective mind when the two sections are geographically contrasted. First of all, association and coöperation are not predominating conceptions in primitive intellects. A much more popular and effective notion is that strangers and visitors naturally are aliens and trespassers. Again, the laws, customs, habits, even food and dress, all play their part in the matter of encouraging this coöperation or separation. The line of division, therefore, between the two regional groups in the Rocky Mountain country was as conspicuously marked as the separation line of opposite pages in a book.

Primitive man was no less curious than superstitious; and, since his homely philosophy was based principally upon his observations of the workings of nature about him, rather than upon abstract reasoning, the natural agencies with

⁷ *Ibid.*, 41.

⁸ *Ibid.*, 42.

which he was most familiar, especially those out of the commonplace, were credited with extraordinary powers, and were considered accountable for all sorts of everyday vicissitudes.

In looking for an explanation of that far-reaching hostility, therefore, the unscientific superstitious primitive minds of the natives might very characteristically be turned with credulity toward those fascinating springs. Not only the bubbling waters, impregnated with sanatory minerals, and enclosed with attractive surroundings, but various other physical phenomena contributed to make this region the indisputably preëminent attraction of the eastern slope of the Colorado Rocky Mountain section.

Leading upward from the eastern plains to this locality and thence over to the summits in the west, was a famous Ute Trail, trodden for unnumbered centuries by health-seeking, homage-paying, enmity-cherishing natives. This renowned pass drew man and beast through the enchanted Manitou region over to the South Park district for the practical purpose of obtaining rock salt, which abounded in many parts of that territory. "The buffalo have for ages resorted here about the last days of July from the arid plains of the Arkansas and the Platte; and here the Utes, Cheyennes and Araphoes, Black Feet, Crows and Sioux of the north, have for ages met and hunted and fought and loved, and when their battles and hunts were interrupted by the chills and snows of November, they separated for their several winter resorts."⁹

Within comparatively short walking distance from the Springs is the far-famed Garden of the Gods, a comparatively small natural park unsurpassed in the whole country for its display of form and color. Huge monoliths resembling shapes of various objects, animate and inanimate, arouse the curiosity and create a half fantastic impression upon the minds of the ordinarily sober and unperturbed white man; and, it is, of course, very evident that the highly colored pageantry by daylight and the grotesque shadowy forms by night went far toward creating, in the minds of

⁹ Quoted from Thomas J. Farnham by Howbert, in *Indians of the Pike's Peak Region*, page 50.

the native, awe and reverence for the incorporeal tenants of this Pike's Peak wonderland. It was not surprising that the ghosts and goblins of this bewitching region should be accounted responsible for this century-prevailing discord, in a time and place when and where human frailties were loaded upon the shoulders of irresponsible spirits.

Venturing back and forth over the borderland of northeastern Colorado, were the Pawnees whose habitat comprised the Platte Valley and the adjoining lands, threaded by the various affluents of the Republican and Kansas rivers. These people were a branch of the Caddoans, a medium-sized stock the representatives of which were scattered in isolated groups along a rather wide strip of territory from the Gulf of Mexico to the plains of North Dakota. Members of this family were met by De Soto on his famous trans-Mississippian journey, and also by De Vaca in his notable wanderings from the mouth of the Mississippi to the confines of New Spain.

Knowledge of the Pawnees runs far back in North American history. It was their village that Coronado found when, led by the Turk, he went on his fool's errand in search of the fabulous Quivira.

It was their village that was visited by Pike; and here he was informed of the then recent journey of the Spaniards, under Malgares, to this region for the purpose of stirring up enmity against the coming of the explorer and his party.

It was among these same Pawnee Indians that Major Stephen H. Long halted his expedition to secure interpreters, and to gain information about the new western lands over which he was about to travel.

It was these same Pawnees, of the Loup River, that especially attracted the attention of James Fennimore Cooper in his Leatherstocking novel, the *Prairie*, and from whom he selected his famous Indian hero, Hardheart.

The Pawnees lived on a sort of no man's land, and, during the early invasions of the various branches of the Caucasian race, they were not very much disturbed, especially by Frenchmen and Spaniards, as were many other native tribes, on more conflict-provoking territory.

While there was noticeable variation in the life and cus-

toms of these people, as a whole, they would naturally be classed as semi-sedentary. For about four months of the year, they dwelt in more or less permanent buildings of logs, bark, and sods, and carried on a rude sort of horticulture. They then left their homes, and wandered about for the rest of the time, principally on hunting expeditions, to supplement their limited vegetable products with wild animal meat.

Their humble rural pursuits did not prevent them from maintaining an enviable reputation as a warrior class. Their councils were strong organizations, their chiefs were men of authority, their war parties were voluntary and efficient.

The relationship of these people to the government has been especially noteworthy. "Through all the vicissitudes of the nineteenth century the Pawnee never made war against the U. S. On the contrary they gave many evidences of forbearance under severe provocation by waiting, under their treaty agreement, for the government to right their wrongs, while Pawnee scouts faithfully and courageously served in the U. S. Army during Indian hostilities."¹⁰

From the ethnological point of view, their manner of conducting wild game expeditions was interesting and altruistic. A buffalo hunt was a tribal affair, and was so organized that each of the families, or lodge groups, should receive its just share of the gross results. Since the homes of these people were permanent, their home life, in many respects, was more significant than that of the plains Indians generally; therefore, when they returned to their earth lodges, after a long hunt, certain serious ceremonials were performed in each of those homes.

Being predominantly agricultural, and realizing the importance of celestial bodies and forces in connection with their limited tillage, their superstitious regard for the movements of heavenly bodies, for birds, clouds, winds, thunder, lightning, rain, cyclones, and other natural and incidental phenomena, affected their everyday life to a far greater extent than was common among natives differently en-

¹⁰ Fletcher, *Handbook of American Indians*, Part II, 214.

vironed and engaged in different pursuits. Shrines, symbols, and ritualistic paraphernalia were always in evidence.

While possessing many natural advantages, as a people, and being inclined to act with unusual intelligence in matters pertaining to the ordinary affairs of persons in their grade of culture, they have received a vastly disproportionate amount of misfortune through diseases, dissipation, murderous attacks from neighboring tribes, and loss of life through enforced removal.

Somewhat less familiar itinerants on Colorado soil but frequent enough to entitle them to attention in this connection, were the Apaches, especially noteworthy as a representative group of the great Athapascan stock, whose members originally overran the greater part of western Canada. In the course of time the Apaches have become divided, so that various bands of them have come to be distinguished by prefixed names, as exemplified in such terms as the Mescalero Apaches and the Gila Apaches.

The Kiowa Apache people consisted of a comparatively small band that in very early times, on their southward migration along the mountain slope, attached themselves for the sake of protection to the more powerful Kiowas, adopting generally the mode of life of their guardians but retaining their own dialect. The two groups became consolidated into practically a Kiowa aggregation, and their fortunes fluctuated as those of a single people.

A much more noted group of this great stock, and far more closely associated with Colorado history, were the Jicarilla Apaches who ranged over southern Colorado, especially along the eastern mountain border, upon the lands adjacent to the Arkansas River, even out upon the plains of present Kansas and Oklahoma, and down into northwestern Texas.

In general, it might be said that the adopted habitat of these Indians was the interlying lands of the upper Arkansas, Rio Grande, and Canadian rivers. The reputation of the Apaches in general has not been of the best, and, in perversity, the Jicarillas have been reported to out-Herod Herod.

In the scantiest of clothing they wandered about, like the Apaches in general, among the wild, woody, and thorny

shrubs and bushes; and constant exposure to sun, wind, and pathless thickets combined to create on each man and woman alike a remarkably thick and tough protective integument. "When a country cannot feed its inhabitants, the inhabitants must provide for themselves elsewhere. Climate and soil transform the Apaches of the American Continent, like the Bedouins and Kurds under almost the same latitudes on the continent of Asia, into nomads, hunters, brigands, and thieves."¹¹

A rather strange feature in connection with these inglorious natives of the Arkansas country was their intimate relationship with the various peaceful Pueblos along the Rio Grande. These two branches of Indians, differing so much in nature, seem to have gone so far in their friendship and unity of purpose as to establish, on the plains, for mutual protection, an outpost which existed during many years.

Pausing for a moment, let us picture more connectedly in our minds those greatly divergent groups under consideration, scattered over the widely extended and remarkably diversified area now comprising the State of Colorado, during those years just before the English-speaking vanguards were climbing over the Appalachian Mountains and crossing the great eastern rivers.

Ebbing and flowing across the northern border were the constantly moving waves of Sioux warriors, repelling ever present enemies and assisting ever endangered kindred defenders.

On the same borderline to the eastward, were the more firmly settled Pawnees, pursuing the arts of peace and of war with exceptional success, deplored the rapidly thinning ranks of their own tribes but calmly facing the inevitable, as rumors of the slowly approaching Caucasian race across the Mississippi kept reaching their ears.

Southward, on the outskirts of this same regional boundary, were the ever roaming Comanches sweeping along on their various missions as if in imitation of their frequent hurricanes, and far outdoing those rivaling tem-

¹¹ *Recluse, Primitive Folk*, 127.

pest-born visitants in the work of leaving death and destruction behind them.

The Kiowas on the southern borderland roamed along the streams and over the hot scantily herbaceous plains of the upper Arkansas country, seeking whatever of animal or vegetable life those wild lands furnished and fighting persistently and with telling results against overwhelming enemies on every side.

In the nooks and corners of the outstretching Colorado mountains dwelt the Utes; and, being primarily forest-inhabiting mountaineers, they differed very notably in physique and general activities from their eternally antagonistic neighbors on the plains. Pitching their camps among the cliff-dwelling cañons of the far southern San Juan country, and, here and there, in the various recesses along the elevations reaching to the river-dividing plateaus of the state northlands, their habitat presented, of course, many noticeably natural advantages and disadvantages. Their mountain-protected homes gave them a feeling of security, and they experienced little difficulty in joining their forces to resist invasions of hostile bands from the piedmont region, or, in sallying forth far eastward on game-gathering quests over alluring lands carefully watched by vigilant enemies.

The hot-blooded Apaches, fit denizens of a hot semi-barren habitat, skulked about over the wild land of their adoption on thieving expeditions, not unlike the half-starved coyotes to which by habit and character they were closely related.

Living within this circle of variable and hostile tribes, and constantly oscillating over the great region between the Poudre-Platte, on the north and the Arkansas on the south, were the closely allied Arapahoes and Cheyennes, literally holding the center of the stage and destined to claim the lion's share of attention from the whites when civilization suddenly raises its banners and becomes firmly established in the Pike's Peak country. Aggressive and defiant, headed by leaders of unusual ability, their blood moistened the parched plains, in the most vital and spectacular battles of the early sixties.

Rumors of what the Englishmen of the Atlantic sea-

board were doing on American soil, in order to establish a civilization, were not long in passing from tribe to tribe and from native to native, as the settlements rapidly grew into existence in the early days of the eighteenth century. The disappearance of the magnificent forests, and, with them, the rapid destruction of wild animal life, so necessary in supplying the common needs of the natives, were obviously looked upon by them with alarm. Unable to cope with their more highly cultured adversaries, these remnants of the weaker race were obliged to abandon their lands and habitations to find security in more remote regions. Even here—since, in primitive society, and especially in Indian tribal society, alien home-seeking groups are likely to meet with hostility and destruction among their own people—many of those westward moving refugees became annihilated between two outstanding inimical forces, the white man behind him and hostile members of his own race ahead. Over the Appalachian Mountain system, vast throngs of home-seeking whites from the Atlantic seacoast, augmented with crowds from the Old World, pushed through the forests of the Ohio country, cleared the lands of animal-sustaining forests, drove out the natives, and sent their own descendants across the Mississippi River to push civilization still farther westward.

Following this movement out on the prairies the wandering native tribes heard of the unceasing western migration of the paleface enemies and the mighty revolutions necessarily following in the wake of those newcomers. The millions of buffalo that roamed over the vast grasslands meant food, shelter, clothing, weapons, utensils, and scores of incidental necessities, vital in the everyday activities of the thousands upon thousands of heterogeneous tribal natives to whom the presence of these beasts meant life or death. Since the Indians of the plains had no permanent records—depending entirely as they did, on hearsay evidence—accounts, bearing upon the conduct of the white men toward the aborigines, as the newcomers marched across the continent and took possession, differed very greatly from one another when reaching the ears of those far distant impulsive natives. Apprehension, therefore,

was neither steady nor intense. When, however, the swarms of representatives of an alien race appeared across the Mississippi, and the red men saw the buffalo, the one indispensable requirement of their lives, disappearing, day by day as if struck by a plague, they naturally felt that resistance was their only means of security.

Yet, long after the destruction of these animals, on a large scale, had been initiated by the whites, there was a period when hostility on the plains was the exception rather than the rule. On the Rocky Mountain frontier was a strange, half romantic commingling of interests between the two races which had not occurred elsewhere while the English-speaking frontiersmen were moving over the country from the Atlantic starting line.

The hunter-trapper period of United States history necessitated an unusual relationship among the various elements interested in the great fur industry of the times, but, in some respects, the most noticeable of all was the alliance between Indian and white man. The natives became the hands and feet of the fur business. In the nooks and corners, upon the rivers and among the rivulets, of the Rocky Mountain region, the red man set his traps, collected his furs, and disposed of them to the Caucasian trader, at posts or other convenient meeting places. Thrifty trappers to whom the peculiar fitness of the Indians for pelt-gathering was known took advantage of the situation and secured great quantities of skins, often at ridiculously little expense, because the natives were less versed in methods of traffic than their temporary employers. The alliances were of still greater significance for other reasons.

While intermarriage between the aborigines and the Spaniards in the far south and between the aborigines and the Frenchmen in the cold north was not uncommon, such relationship between Indian and Englishman was not encouraged and was of comparatively rare occurrence in early United States history. The peculiar circumstances attending the advent of white adventurers and hunters of fortune into the wild Rocky Mountain regions, however, created a marked modification of this rule. The roughest human components of a community in their sober moments would readily acknowledge the natural advantages of home

life, while the more cosmopolitan members, even of a half-barbaric society, would feel that a home, never so humble, would be an almost indispensable asset. It need not be surprising, therefore, that so many of the trappers, and a few other stray occupants of a region, shut off from civilization by a longitudinal zone several hundred miles in width, took to themselves Indian wives. In fact, several men that stood out prominently in the Rocky Mountain history of that time, leaders in the activities of the day, mated with Indian women.

Elbridge Gerry, an early Colorado settler bearing a distinguished name, a lineal descendant of a signer of the Declaration of Independence, justified such a marriage on his part in response to a request from some white acquaintances of later years who urged him to leave his Indian mate and children. He courageously refused to do so, asserting that he had married this Indian girl when no white woman lived within five hundred miles of his residence, and he would not forsake his family to please newcomers.

James Bridger, trapper, trader, and scout, accredited discoverer of Salt Lake, guide for Sir George Gore, Gen. Albert Sidney Johnston, Gen. Phillip Sheridan, and several other notable men of various enterprises, partner in the Rocky Mountain Fur Company, and founder of Fort Bridger, was the husband of an Indian woman—in fact, of three Indian women, each of a different tribe.

Thomas Fitzpatrick, famous Indian agent interpreter, trader, and guide for Generals Kearny and Fremont, and many government exploring expeditions, married an Arapahoe maiden.

James Baker, the well-known eccentric frontiersman, brave, big-hearted, was a typical example of the extremely uncomformable trapper. Surrounded by Indians and marrying into one of the tribes, he adopted the habits and dress of those people to such an extent that civilization became to him a state of society, scrupulously to be avoided.

William Bent, the builder of the famous fort that bore his name, and probably the most noted fur-trader of Colorado history, married the daughter of a chief. She was of inestimable value to him in his business transactions

with the Indians who visited the fort to dispose of the furs which had been gathered by the various tribes of the Arkansas Valley and the adjoining plains.

The brave nation-honored trapper, scout, and hero, Kit Carson, married an Indian girl, who died shortly afterward, leaving a little daughter whom the father took back to St. Louis to be educated.

There were scores of others, of less prominence but extremely important citizens, like John S. Smith, the Indian trader and first treasurer of the St. Charles Association, an organization which constituted the beginning of Denver as a municipality.

In the days of early settlements, with the country full of restless tribes, the valuable services of those men with their native wives was recognized and sought in the practical everyday affairs of life, and often tragedies were averted by the timely intercession of such influential peace-seeking mediators.

On general principles, the advisability of such alliances between the two races may be justifiably questioned by historian or ethnologist, but the times created a situation, not a theory. During the comparatively long period of western frontier life, in which daily contact between representatives of the two races was unavoidably thrown into the foreground, a wise policy of procedure was a "consummation devoutly to be wished." In the rapid movement of events, problems were met more often by expediency than by philosophy. Even in later days, when wars between the two races have ceased, advisable alliances between them have constituted a question of deep interest. Upon this topic Francis E. Leupp, the well known former commissioner of Indian affairs, writes: "Intimately speaking, it may be said that for persons very sensitively organized, so close a union as marriage with those of widely different ancestry, associations, and mental habits is always a hazardous experiment; but regarded in its broader aspects, the intermarriage of Indians and Caucasians has nothing to condemn it. There is no barrier of race antagonism to overcome, for the Indian and the white mingle everywhere on a legal and social equality; and the offspring of such a marriage derives from each of the parent races certain

traits which work well in combination. With his Indian blood he inherits keenness of observation, stoicism under suffering, love of freedom, a contempt for the petty things which lay so heavy a burden on our convention-bound civilization; with his white blood the competitive instinct, individual initiative, resourcefulness in the face of novel obstacles, and a constitution hardened to the drafts made upon its strength by the artificialities of modern life."¹² On the same page he writes regarding the employment of these white men with native wives: "Their occupations as hunters and trappers, guides, woodsmen, scouts, miners, telegraph and railroad builders, pony express riders, or other work in the pioneer line, necessarily carried them into the wilds and kept them there."¹³ To this he adds: "What might have been expected happened: the pickets of civilization adopted the life of the country into which fate had thrown them, and married Indian women who could cook their meals, take care of their cabins, and share uncomplainingly their excursions through forest or desert."¹⁴

The foregoing remarks, from Commissioner Leupp's book, are offered here, not as an argument in favor of race amalgamation but to present opinions of a man fitted, through years of experience, to speak on a phase of racial economy concerning which much thought has been given. The matter that especially concerns us, in the light of what the next few years were destined to bring forth, is the absence of general hostility then existing on the part of the two groups.

It is not to be supposed, however, that over that vast expanse of wild land, absolute amicability existed between two classes of human beings so different in experiences, culture, and ambitions. The brutish elements of the native race were frequently exhibited by treachery, brigandage, and murder, while lawless vicious profligates of the whites often disrupted the homes and incited the anger of the quiet inoffensive members of the Indian villages which they visited.

¹² F. E. Leupp, *The Indian and His Problem*, 343, 344.

¹³ *Ibid.*, 344.

¹⁴ *Ibid.*, 345.

With the discovery of large quantities of gold, in 1858 and 1859, began the rapid revolution of affairs in the Rocky Mountain country. During the preceding decade, the natives watched with probably more curiosity than alarm the continuous stream of migrants passing over plain and mountain to the California gold fields. So long as the procession did not halt in the mountain country to molest the natives and make settlements, there was little, beyond the amazement at numbers, to excite the emotions of the tribal population. Men of their own blood were part and parcel of that great migratory band; and, it is an interesting incident of American aboriginal fatalism that in that procession were identical Cherokee Indians, who, at that time, finding grains of gold at the head of Cherry Creek, were in later years to be the guides and companions of the Russell brothers—the gold-discovering vanguard of the Rocky Mountain region, and the leaders of the vast throngs of Caucasians that were to plant a civilization in the heart of this vast western country, a civilization destined to sweep away the barbaric culture of the native occupants.

That evolutionary edict which has been proclaimed from the housetops of progress for thousands of years, in its journey round and round the world, was heralded from the crest of the North American continent—that the weaker and uncultured must be supplanted by the stronger and progressive.

Such a change, of course, could not be made without a struggle. From their tepees on the plains, the aborigines saw the hosts of gold-hunters and home-seekers advancing.¹⁵ Every possible means of transportation was put to

¹⁵ Back in the thirties, Colonel Henry Dodge had conducted an expedition—purely military in character and the first of its kind—to the Rocky Mountains. It consisted of more than a hundred soldiers, and was sent by the United States Government for the purpose of bringing about a better understanding and greater harmony, not only between the whites and the Indians but between the various Indian tribes themselves, the members of which were in constant turmoil. Dodge came in from the northeast up the South Platte, and passed down over the plains skirting the mountains, and thence, by way of the Arkansas River, out into the States. On this journey of sixteen hundred miles, the leader met and counseled with practically all of the important tribes and left them, feeling that his peace-suggesting mission had been of great value.

use by those westward-bound travelers. Horse, mule, and ox toiled painfully over rolling prairies, hot sands, frozen rivers, and obstructing bluffs. Covered wagons, two or four wheeled carts, spacious coaches, light buggies, tough-wooded buckboards, and even man-motored wheelbarrows constituted a six-hundred-mile line of moving conveyances, comfortable and comfortless, reaching from the Missouri River to the Rocky Mountains.

Wonderment stirred the soul of the native, and immediate resistance seemed his only salvation. The white man's method of protracted debate and long-deferred action was not understood by this impulsive unlettered man. His hunting grounds were rapidly becoming preempted and the all important buffalo, deer, and antelope were disappearing like the autumn forest leaves.

In the last days of the '50s, the throngs from the eastlands were on hand, exploring the country, prospecting for minerals, and permanently settling in advantageous localities of mountain or plain. In 1861 Colorado became a full-fledged territory, and the beginning of the final struggle was at hand. Back in 1851 a treaty had been made by the United States Government in which it was agreed that the Ogalalah and Brulé Sioux, the Arapahoes, and Cheyennes should be given that portion of land, roughly bounded by the North Platte, the Rocky Mountain Divide, the Arkansas River, and a line running over the plains, beginning in the vicinity of the eastern boundary of what today is Colorado and extending to the junction of the Platte forks. The region comprised a little more than one hundred and twenty-two thousand square miles, almost exactly the area of the present State of New Mexico. Certain necessary restrictions were placed upon these tribes and small annuities were to be received by them. Of these three divisions the Sioux were to range along the northern state boundary line, while the Arapahoes and Cheyennes were to hold the country between them and the Arkansas.

Treaty-making and treaty-enforcing, along with some acknowledged advantages, had nevertheless created unpleasant relationships here and there in the Rocky Mountain country during the '50s.

Specifications in the treaty, requiring the tribes to

remain on their own lands, to refrain from molesting travelers, and to keep out of war with neighboring tribes, were too commonly disregarded; and the use often of military men to enforce the provisions of the document had not tended to nourish friendly relationships.

In 1861 the Cheyennes and Arapahoes were persuaded to cede a large part of their lands to the Government. A reservation was formed for them on the north bank of the Arkansas, with the western boundary line running north and south near the mouth of the Huerfano River. No sooner had these natives come to realize that they had lost in parting with that large highly valuable territory—abounding not only in wild animal life but in streams with banks nourishing valuable wild cherries, currants, plums, and gooseberries—than they regretted it. Many disclaimed having taken part in the transaction and so considered themselves free from obligation. Others, feeling that they had been overurged and defrauded, held their promises at low value. The more the matter was contemplated the more determined they were to abrogate all pledges. To drive away the settlers and regain their losses was not the least cherished plan that received attention at incidental meetings and in tribal councils.

Realizing their inability to cope with the whites without better preparation, they began to exert their energies toward gaining possession of more arms and ammunition. In this they were consistent, and there was no lack of white men ready, for an inflated remuneration, to furnish them all the necessary accountrements of war. They were further stimulated by the fact that most of the able-bodied men were leaving the territory to take part in the Civil War, which circumstance greatly reduced the strength of the whites. The eyes of the nation were turned naturally to that great struggle, and the settlers of Colorado were left largely to take care of themselves. A series of events, rapidly widening the breach between the races, followed one another.

In the year 1862 Governor Evans—who had recently succeeded the first of the territorial governors, William Gilpin—in a message to the legislature, urged the enactment of a militia law for protection against the Indians,

who might be incited to deeds of violence at any time, and under the slightest provocation. The recommendation immediately became a law, and military organizations of greater or less importance began to follow, but sadly disproportionate to the need.

In the meantime a general sentiment in favor of crushing the power of the newcomers was spreading out over the plains among the Indians, and unmistakable signs of activity in that direction were in evidence. Thefts of horses, provisions and munitions of war, on an extended scale, gradually began. On the plains tribes that had been making war on one another from time immemorial now began to combine their energies in support of a common project. Early in the game, by 1864, even the Utes and piedmont tribes had relaxed their hostilities, since plains and mountains were conjointly becoming the homes of the newcomers. Governor Evans, disbelieving in slavery of any kind, liberated women and children of the Ute and Navahoe tribes that were held in servitude by Mexicans in the southern part of the territory. This course of procedure stirred up some temporary local feeling, but was not serious enough to create any marked general attention.

By 1862, and soon after Governor Evans had entered upon the duties of his office, Utes had raided the Laramie plains, had overrun Middle Park, and had congregated in the San Luis Valley, after being pursued by General Cook with a force of cavalry. Uniting with the southern branch of their people these Indians were planning to play havoc with the white population of that region. A council was called by Governor Evans which, with several other noted officials, he attended. Perhaps the most fortunate feature of this assembly was the presence of Ouray, the Ute chieftain, the greatest leader of the mountain tribes, the loyal friend of both races, and an outstanding figure in early Colorado history. He dissuaded the restless leaders from going on the war path, and hence, on this as on many other occasions in the history of the state, merited the gratitude of the early settlers. The result was the forming of one of the most successful of Indian treaties. It was an outstanding triumph for the governor in the beginning of his

dealings with the natives, and when the plains were rapidly becoming hatching grounds for Indian conspiracies.

In 1863, on the territory reaching from the famous Oregon Trail at the north to the equally famous Santa Fe Trail at the south, small parties of natives might be seen daily on the less traveled pathways and in unfrequented nooks and corners, stealthily gathering information regarding the various settlements, ranches, and solitary habitations in possession of white men. It was learned afterward that, on these missions, plans were laid whereby some 800 warriors, gathered from numerous tribes and from over a large extent of territory, rendezvoused near the sources of Beaver Creek, were to be divided into bands of various sizes, and were to attack concertedly all the whites of this great region, with the object of destroying or displacing them. This plan was especially encouraged by Chief Little Crow of the Sioux, who urged the Indians in general to unite during those Civil War times—arguing that while the whites were killing one another, an opportunity was offered for exterminating the Caucasian settlers of the whole Rocky Mountain region.

The design was thwarted by the timely activity of Elbridge Gerry who, it will be recalled, had married a Cheyenne woman, and was managing a ranch on the South Platte River at a distance of about seventy miles northeast of Denver. Warned of the proposed attack by two Cheyenne chiefs, Gerry hastened on horseback to Denver, gave the news to Governor Evans, who immediately sent messengers into all parts of the surrounding country; so that, when the hostiles appeared, the whites had found refuge or were prepared to meet the emergency.

The culmination of the rapidly growing racial antagonism came in 1864. In April of that year 175 cattle were driven from the herd of Irwin & Jackman, government contractors, encamped in the Bijou basin, forty miles to the southeast of Denver. Lieutenant Ayre with a detachment of cavalry was sent in pursuit of them but recovered only twenty of the animals. This bloodless event was the occasion of another more serious encounter shortly afterward near Fort Larned, at the head waters of the Republi-

can River. In this engagement between twenty and thirty Indians were killed. At almost the same time a herd of horses were driven from Kiowa Creek by a band of the same troublesome Cheyennes, and, out of the small company of whites sent against them, four were either killed or wounded.

Near the junction of the North and South Platte, Major Downing, taking the initiative, killed some twenty-five or thirty Indians, destroyed the village, and regained a hundred horses, with the loss of one soldier.

The few military men that were allowed by the Government to remain on this vast upland territory were scattered far and wide, were unable to be transported from place to place with sufficient alacrity to be of assistance to one another, and were in constant danger of attack by overwhelming native forces.

In 1845, just ten years after the Dodge Expedition, already noted, Col. Stephen W. Kearny had led a somewhat similar one, and after traversing the plains for several months reported: "There are a number of white men from our own States who have nominally their residence near Taos and Santa Fé, and who come frequently into the Indian country between the Arkansas and the Platte, between 'Bent's Fort' and 'Fort Laramie'; bringing whiskey with them, which they trade to the Indians; consequently causing much difficulty and doing much harm."¹⁶ The use of liquor was always an important factor in the disturbances between the two races, and was as pronounced in the '60s as in the '40s.

Commerce on the Santa Fé Trail had been for many years an exceedingly tempting lure for thieves and murderers; and travelers continued to be harassed and put to death by marauding bands of aborigines stealing in from every direction. Communication with the East was cut off, farms were abandoned, stage coaches were attacked, the drivers and passengers murdered and the valuables distributed among the assailants. Danger of famine arose as a consequence of this.

¹⁶ Quoted in Stone's *History of Colorado*, I, 84.

It was reported during the first week of June, in that memorable year of '64, that a large number of Indians were on their way to the City of Denver to massacre the inhabitants and destroy the buildings. The town was placed under martial law, sentinels were stationed on the outskirts, and no lights were allowed to appear in any buildings, public or private. Although this alarm proved to be false, yet many steady-nerved people were terrorized; for the fate of the men was usually a horrible death, and "The treatment of women, by any Indian, is usually bad, but by the plains Indians especially so."¹⁷ Running down through the recent years, the conduct of the whites had also not been exemplary, so each side could cite grounds for complaint. "On Saturday, April 14, 1860," says Wharton, "a party of Cheyenne and Apache Indians visited Denver for trading purposes. During the night following their arrival their lodges were visited by a set of drunken desperadoes and shameless acts of violence committed. * * * The dastardly scoundrels who committed this outrage also stole three mules belonging to the Indians which they ran off some ten miles during the night."¹⁸

In the midst of this growing antagonism, with scores of minor outrages being reported day by day from various parts of this conflict-nursing section, the climax came on the eighteenth of June, two weeks after the Indian scare in Denver—a time when an excited populace was at the height of anxiety, and even an unauthoritative rumor was like added oil to a conflagration.

A settler named Hungate with his wife and two children residing on Running Creek, about twenty-five miles east of Denver, had just been murdered, the husband and little boy scalped and all more or less mutilated. The buildings had been burned and the movable property appropriated. The mangled bodies were taken to Denver, and placed on exhibition.¹⁹

¹⁷ Hall, *History of Colorado*, I, 336.

¹⁸ *History of the City of Denver*, 71.

¹⁹ The bodies of the Hungate family now lie in Fairmount Cemetery, Denver, to the left of the main driveway on entering, and at a short distance from the chapel.

This deed was committed by a band of Indians²⁰ under the direction of Roman Nose, a leader who had for several years professed friendship for the whites.

On the nineteenth of June, the night following the exhibition of the Hungate victims, a report was brought in by some settlers that Indians were within a few miles of Denver, for awful moanings had been heard. The report caused city-wide consternation. Some 500 women and children were taken from their homes and placed in buildings of greater safety, while the men and larger boys were placed on patrol duty, or sent to the defense of important possessions in and about the town. Scouts sent out to reconnoiter returned with the information that the noises came from some near-by Mexican herders who were accustomed to chant to their cattle in order that the beasts might rest more quietly, assured of the presence and hence the protection of their human guardians. The whole occurrence, with its many amusing and interesting incidents, is valuable to us chiefly as an illustration of the nervous strain in the community.

It seemed as if fate was daily adding fuel to the flame. Of each other the two races had become thoroughly distrustful. During the preceding year Governor Evans had sent communications to Washington, urging that protection to travel on the great plains and security to the settlements of the territory be furnished; but the demands of the Civil War were so emphatic, and especially the paramount demands during that critical war year, 1863, that the struggling existence of the Rocky Mountain hamlets seemed a matter which had to be left largely in the hands of those on the scene of action. More and more convinced that an uprising of many tribes had been carefully planned, Governor Evans had appealed to Gen. S. R. Curtis of the United States army and commander of this Rocky Mountain de-

²⁰ Good authorities differ in regard to whether the murderers of the Hungate family were Arapahoes or Cheyennes. There is the same difference of opinion in regard to the relationship of Roman Nose, a very extraordinary leader. Forsyth, whose soldiers finally killed him, and some Colorado historians thought him to be a Cheyenne, while Governor Evans and other excellent informants class him as an Arapahoe.

partment, asking for a sufficient force to protect the people; but Curtis, stationed far away at Fort Leavenworth, had reported that he had no troops to spare. The recent massacre in Minnesota, at New Ulm, in which a thousand whites had lost their lives and which had caused the governor of that state to offer a bounty on Indian scalps, was still fresh in the minds of the Colorado people as the intensity of the times grew from day to day.

Things went from bad to worse. By autumn, the whole country between the Rocky Mountains and the Mississippi River and reaching from Canada to Old Mexico was swarming with perpetrators of atrocities. "For three hundred miles west of the Big Sandy in Kansas every building had been burned, all the movable property taken, and about eighty of the settlers massacred."²¹

History-making was rapid, exciting, and many-sided, during those trying days, and only a few of even the outstanding events can be noticed in passing. To meet an emergency the improvised territorial militia had been called out and the Hon. Henry M. Teller placed in command to patrol the stage route between Denver and Julesburg. The force proved to be too small to meet the situation successfully.

In June, 1864, Governor Evans sent out a circular to the Indians of the plains, in which are found these words: "In some instances they (the Indians) have attacked and killed soldiers, and murdered peaceable citizens. For this the Great Father is angry, and will certainly hunt them out and punish them; but he does not want to injure those who remain friendly to the whites. He desires to protect and take care of them. For this purpose I direct that all friendly Indians keep away from those who are at war, and go to places of safety. Friendly Arapahoes and Cheyennes belonging to the Arkansas River will go to Major Colley, United States agent at Fort Lyon, who will give them provisions and show them a place of safety."

In September the Cheyennes, who had established their most important village at the source waters of the Smoky Hill Fork, sent three messengers to Fort Lyon, 140 miles

²¹ Smiley, *History of Denver*, 404.

INDIAN CHIEFTAINS ARRIVING IN DENVER, SEPTEMBER, 1864, FOR
COUNCIL WITH GOVERNOR EVANS



away to the southwest, with a note written by George Bent, the halfbreed son of William Bent, and addressed to Major S. G. Colley, the Indian agent for the Arapahoes and Cheyennes. The message, in substance, was that they were willing to make peace, provided the agreement should include also the Kiowas, Comanches, Arapahoes, Apaches, and Sioux. The note also proposed an exchange of prisoners.

No Indian prisoners were in the hands of the whites, but Major Wynkoop, commandant of the post, was anxious to have the white prisoners released. Accordingly, at the head of 127 mounted men, with two howitzers, he made his way to the Cheyenne encampment where he was immediately surrounded by 600 enemies apparently ready to begin, at a moment's notice and with but little provocation, the proposed work of Caucasian extermination.

Having informed his listeners that he had no authority to make a treaty of peace, and also having recovered the white prisoners, he urgently invited the chiefs to accompany him to Denver, where a conference could be held with the governor.

At the call of Governor Evans to discuss the situation, a council was held at Camp Weld, Denver, on the twenty-eighth of September. The white population was represented by Governor Evans, Colonel Chivington, Major Wynkoop, Indian Agent Simion Whiteley, and Interpreter John Smith. The Indians were represented by Black Kettle, White Antelope and Bull Bear of the Cheyennes; Neva, Heap Buffalo, Notane and Bosse of Arapahoes.

Governor Evans reminded them of his endeavors to make peace, and reproached them for not meeting him when he had called a council at the source of the Republican River. He accused them of making alliances with the Sioux. He warned them against the consequences of future warfare, and told them that soon the plains would swarm with United States soldiers. They were given to understand that a treaty of peace could not be made, since General Curtis had sent a telegram from Fort Leavenworth that no terms of peace could be considered without his consent. They must therefore appeal to the United States Government.

Black Kettle and Bull Bear made addresses, professing a desire for peace, reciting the grievances of their people, denying alliance with the Sioux but claiming the Sioux to be the original conspiracy-makers, and finally acknowledging recent atrocities but blaming them upon the younger restless members of the tribes.

The climactic event seems to have been when Colonel Chivington arose and said: "I am not a big war chief, but all the soldiers in this country are at my command. My rule of fighting white men or Indians is to fight them until they lay down their arms and submit to military authority. You are nearer Major Wynkoop than anyone else, and you can go to him when you get ready to do that."

With this, the meeting dissolved; and, to one looking back upon that memorable council, with all the possibilities for good or evil which it involved, there seems to have been a woeful lack of those elements which tend to harmonize. Distrust, accusations, denials, threats, and insincerity seem to have characterized too much the conference as a whole, and the two factions parted obligationless. There was no constructive proposition on the part of the whites, and Chivington's speech must have been confusing to a barbaric race.

Soon after the Denver Council, Governor Evans departed for Washington, leaving matters in the hands of Acting Governor Elbert and the speech-maker just noticed, John M. Chivington of Apache Cañon fame and commander of the Colorado Military Division, but subordinate to General Curtis of Fort Leavenworth. The Governor remained in the East for more than a half year, consequently the stirring events that immediately followed were not directed by him.

After urgent appeals from Governor Evans, a volunteer regiment had been recently raised to serve for one hundred days. Lieutenant George L. Shoup, a very efficient officer of the First Colorado, had been given charge of the enlistment and training of this new organization, which became designated the Third Regiment of Colorado Volunteer Cavalry.

"Following the advice of Governor Evans, about 400 of the Cheyennes and Arapahoes from the Cheyenne Valley

surrendered at Fort Lyon to Major Wynkop and were rationed at the post. Not long after, Major Scott J. Anthony succeeded to the command, and after feeding the Indians for a short time restored to them a portion of their arms, and ordered them to remove to the region of Sand Creek, forty miles distant, where they could hunt, removed from any contact with white people passing along the road.”²²

Accordingly, Black Kettle with his Cheyennes and Left Hand with his Arapahoes did as directed. The whole encampment numbered possibly eight hundred. A very vital point in connection with what followed, in the course of the next few weeks, was the understanding on the part of the Indians encamped on Sand Creek whether they were there under the protection of the United States. In other words, could an attack under the command of a United States military officer be justifiable under the circumstances?

No immediate disturbance seems to have been reported from the Arkansas basin. Travelers seem to have passed and re-passed without molestation, and the fall crops seem to have been gathered without hindrance.

Regarding the situation at this juncture, the three most responsible men of the day seemed to have very definite opinions. Governor Evans, feeling the safety of the settlers to be resting on his shoulders, wished the Indians, especially the hostile ones, to feel and acknowledge the power of the Government; General Curtis thought that leniency on the part of the whites was not the course to be pursued and sent telegrams unfavorable to immediate peace-making; Major Chivington felt that summary and unmistakable chastisement was a necessity.

Equipment having arrived at Camp Weld for use of the hundred days men, who for weeks had been impatiently waiting to march, Colonel Chivington,²³ taking the greater

²² H. H. Bancroft, *History of Nevada, Colorado, and Wyoming*, 466.

²³ “Colonel Chivington acted upon his own initiative in this matter, and without authority, either from Governor Evans or the War Department. In fact the War Department had suspended the Governor’s power to take any action in regard to the Indian war and he had been so notified by army officials.”—McMechen, *Life of Governor Evans*, 136.

part of these same units of the First Cavalry, and two pieces of light artillery, set out with this force of more than six hundred men in all, moved quietly to Bijou Creek on the Platte-Arkansas Divide, and again encamped. Leaving this place in the middle of November, he reached Fort Lyon at four o'clock in the afternoon on the twenty-eighth of the same month. Here he received reinforcements and two howitzers from Major Anthony. Starting at eight o'clock on the same evening with nearly a thousand mounted men,²⁴ and the four pieces of cannon, he continued his journey, covering the forty miles between Fort Lyon and the Sand Creek Indian encampment, during the night hours. On that clandestine journey, the soldiers were apprised of the fact that they were to attack the Indians; and, according to good authority, were given to understand that they were to kill, without consideration, men, women, and children.

Sand Creek, a southeastwardly flowing stream of two hundred miles in length, rising on the piedmont plateau east of Pike's Peak, and emptying into the Arkansas within a distance of thirty miles from the state line, swings to the east, and northeast, some forty miles above its mouth, creating a notable bend²⁵ fringed with formidable bluffs. The width of the comparatively dry and notably sandy bed, at almost any place along the stream in that vicinity, averages not less than two hundred yards. The banks are from three to fifteen feet in height, with coarse grasses and rushes growing luxuriantly at their bases. Water pools, resembling miniature lakes, are scattered here and there, over the spacious bed, upon which a thin lazy meandering stream manages to maintain an existence at certain intervals during the year.

Pitched upon the dry sandy bottom lands of this stream, where the bend is conspicuously concave toward the north

²⁴ The exact number seems to have been as follows:

From the Third Colorado (100 days men)	650
From the First Colorado	175
From Fort Lyon troops	125
<hr/>	

Total

950

²⁵ Sometimes called the "Big South Bend."

were the lodges of the Indians, arranged in several groups, each under the leadership of a prominent chief. In the middle of this encampment was Black Kettle's band of Cheyennes, with the groups under Lone Bear, White Antelope, and War Bonnet, reaching off to the west in the order named. To the east of Black Kettle, was Left Hand's cluster of Arapahoe lodges and beyond these in the same direction were the abodes of Yellow Wolf.

Authorities differ considerably in regard to the number of lodges and consequently the number of Indians of the camp—"Guerrier in his testimony in 1865 says there were eighty lodges with four or five persons in each lodge. John Smith, who was also in the camp, says one hundred lodges, two hundred men, and four hundred women. There were ten lodges of Arapahoes and the rest were Cheyennes."²⁶ "From a study of all reports, it is believed that there were not over six hundred men, women and children in all."²⁷

Just at sunrise, when the troops reached the vicinity of the village, a large herd of ponies, numbering more than a half thousand, was discovered grazing on the plain at the left of the line of march. Orders were given that a detachment of soldiers be sent out immediately and very cautiously between the animals and their sleeping owners, for the purpose of capturing that multitude of dumb unsuspecting Indian auxiliaries. The whole herd was easily secured and driven away to a place remote from the encampment. Other ponies were quietly feeding on the lands just to the north of the village and proved of great convenience later during the hurried Indian flight, especially in the escape of the women and children.

Leaving a few men to take charge of the captured horses, the soldiers after being divided into three bodies, moved toward the Indian lodges. One of mounted troops passed around the eastern end of the encampment and along the northern banks of the stream, just on the other side of the village. Another mounted battalion followed the southern bank in the same general direction. The third passed on foot up the dry bed. As an outlet of escape, the Indians

²⁶ G. B. Grinnell, *The Fighting Cheyennes*, 164.

²⁷ Stone, *History of Colorado*, I, 94.

were thus left with only a comparatively narrow opening to the north upon the bed of the stream and over the plains bordering it. This route led naturally to the Smoky Hill River region.

The firing seems to have begun at the eastern end of the village by mounted troops under the command of Anthony, but was followed by an attack all along the line almost simultaneously.²⁸ The whole village, of course, was thrown into instant confusion by this sudden assault, in the early morning. Seeming unable to understand the onslaught, a large number of the Indians crowded together around the lodge of Black Kettle. Authorities state that having been presented with an American flag some years before, he hoisted this upon a pole in front of his lodge and under it a small white flag to assure the soldiers that the camp was not hostile. The three lines of soldiers continued their general advance, the mounted men passing up both banks of the stream, with Chivington and his forces moving on foot up the dry sandy bed. The firing, as already noted, became general almost at the beginning of the engagement. John Smith who had been trading in the camp ran from one of the lodges toward the troops, but, finding himself a target for them, hurried back to save his life. In the midst of this firing, a private, named George Pierce, hastening on horseback to rescue Smith, was killed by an Indian and fell, the first white victim of the fight. In this earliest part of the conflict, White Antelope with his hands raised in token of surrender fell; and Left Hand, an Arapahoe, standing like a statue, refusing to fight men whom he had always regarded as friends, met the same fate. The frightened Indians found no semblance of security in any quarter, and were thrown into greater and greater confusion as the soldiers drew nearer and nearer. Sturdy warriors, old men, women, and children, gathered in little groups among the sand hills, huddled in nature-made pits, fled for refuge to piles of driftwood, and congregated behind any scattered clumps of bushes or rushes

²⁸ "Just as the sun rose they dashed upon the enemy with yells that would put a Comanche army to the blush."—Editorial in the *Rocky Mountain News*, December 17, 1864.

that promised temporary protection. Here, in their unavailing retreats, they were shot down indiscriminately, since the order had been given to the soldiers that no prisoners were to be taken. Under the circumstances, death was to be the toll exacted, without regard to age, sex, or rank, and the mandate seems to have been very faithfully obeyed. If human testimony is worth anything, there is plenty of it to show that the conduct of some of the white citizen-soldiers, at this battle, was of the kind that the most indulgent of chroniclers cannot review without deepest feelings of regret.

From almost the beginning of the engagement the howitzers did very effective work. The shells bewildered and distracted the Indians to such an extent that it was impossible for them to concentrate with success, either as assailants or defenders. Squads of mounted white men independently dashed about among the knolls and ridges, killing any hiding members of the enemy that might be seen; while the foot soldiers traveled about on the bed of the creek and through the ravines in search of any Indian estrays moving around either singly or in groups.

From the commingling of fire, bullets, and explosives, which ceaselessly met them from three sides, the remnants sought the only avenue of escape which was left to them, and which has been already noted. Passing northward along the sandy bed of the creek and over the plains just to the east of it, like human beings fleeing from a conflagration, the fugitives, dragging after them the helpless members of the band, hurried away. Placing upon ponies the wounded and others that could not walk well, and leaving their dead to the mercy of tempests and wild beasts, the disorganized survivors fled for a half-hundred miles seeking refuge among a body of Cheyennes and Arapahoes encamped on the Smoky Hill River. Black Kettle with about two hundred of his warriors escaped, while eight or ten²⁹ other noted chiefs were left as corpses. At mid-after-

²⁹ Among the Cheyenne chiefs killed the most important ones were: White Antelope, Standing Water, One Eye, War Bonnet, Spotted Crow, Two Thighes, Bear Man, Yellow Shield, and Yellow Wolf.—Grinnell, *op. cit.*, 167.

noon the soldiers congregated at the camp because there were no more Indians to kill.

As one would naturally suppose, the number of losses on the part of the aggressors could be rather accurately determined, which seems to have been ten killed and forty wounded; but there has been a wide divergence of opinion regarding the loss of the besieged. "The number killed in the attack was variously estimated by the officers of troops at from one hundred to eight hundred. Chivington reported five hundred killed. Bent says over a hundred and fifty were killed * * *. Of the killed, two-thirds were women and children."³⁰ "It can never be known how many Indians were killed in this battle. Chivington reported five to six hundred and the other statements vary between seventy-five and three hundred, the latter being Anthony's estimate. One thing is certain, that of the original encampment many escaped to the main body on the Smoky Hill, but all who could be reached with rifle or cannon were killed, warriors, women, and children indiscriminately."³¹ "It was estimated that between three and four hundred of the savages got away with their lives. Of the balance there were neither wounded nor prisoners. Their strength at the beginning of the action was estimated at nine hundred."³² "In no single battle in North America, we believe, have so many Indians been slain."³³

Exceedingly unpleasant are the reports in regard to the behavior of the troops toward the enemy. There is abundance of evidence attesting that the soldiers killed indiscriminately men, women, and children, scalped and otherwise mutilated their bodies, and conducted themselves more like fiends than like human beings.³⁴

³⁰ Grinnell, *The Fighting Cheyennes*, 167.

³¹ Hall, *History of Colorado*, I, 350.

³² From editorial in the *Rocky Mountain News*, December 17, 1864.

³³ Ibid., December 17, 1864.

³⁴ "They [the Indians] fought valiantly, and considering the odds in numbers, killed and wounded about as many as the troops—all of their killing being of fighting men, while the greater part of those killed by the troops were old men, women, and children."—Bancroft: *Nevada, Colorado, and Wyoming*, 467. Footnote.

On good authority it was reported, at the time of the battle, that scalps of white people were found in the lodges of the enemy, and the report is also confirmed that scalps were displayed in Denver between the acts of a theatrical performance, purporting to have been taken from the heads of Indians at Sand Creek. Scalps were displayed in Denver, it is true; but it is claimed they were scalps of whites found in Indian tepees.

Having overwhelmed the Indians of the Sand Creek encampment, the soldiers remained on the ground during the rest of the day, watching for any stray hostiles and examining the abundance of robes, blankets, provisions, and other valuable articles which had so recently been the property of the dead, or left by the fugitives in their compulsory flight.

Tarrying for a second day and night at the camp, gath-

“All of the circumstances of the affair, the further details of which are too revolting to be narrated here, were attended by a savagery almost equal to that charged upon Indians in their most murderous warfare.”—Smiley, *History of Denver*, 407.

“Whether the Battle of Sand Creek was right or wrong, these fiendish acts can never be palliated, nor can there ever be in this world or the next any pardon for the men who were responsible for them. It was this [killing women and children] more than any other stain attaching to this historic tragedy which brought the condemnation of mankind upon the leaders of that terrible day, and which, strive as we may to efface it, will remain as the deliberate judgment of history.”—Hall, *History of Colorado*, Vol. I, 350-351.

“Lieutenant Olney of the First Colorado Cavalry, swore at the investigation in 1865 that he saw Lieutenant Richmond, of the Third Colorado Cavalry, shoot and scalp three women and five children who had been captured by some soldiers and were being conducted to camp.”—Grinnell, *The Fighting Cheyennes*, 168.

Nine soldiers of the Sand Creek fight, when mustered out of service and on their way to the East, were killed by Cheyennes on the South Platte, and Indian scalps were found in their valises. “Little Wolf’s scalp was recognized at once by a peculiar little shell which he had always worn, still attached to the hair. White Leaf’s scalp was known by the light color of the hair.”—Ibid., 184.

“The women and children crowded together for safety, but the troopers killed them as they stood. Nor were the wounded spared; the white men scalped and mutilated the bodies in a manner unsurpassed by any blood-thirsty savages in the past.”—Stone, *History of Colorado*, Vol. I, 93.

ering the spoils of victory and reconnoitering in a general way, the soldiers made preparations for leaving that battle ground, which was destined to attract so much attention in subsequent years. The wounded and dead soldiers were placed in the hands of Major Anthony, who, with the ponies and other captured property, returned directly to Fort Lyon. Chivington, selecting the ablest men and best horses of his command, marched down the Big Sandy Creek to the Arkansas, thence along that river to the Kansas line, in pursuit of Little Raven with his small band of Arapahoes. After a fruitless march of several days, during which no enemy was seen, and mindful of the fact that the soldiers' term of enlistment had already expired, the troops returned to Denver and were mustered out during the last days of December. The captured horses seem to have been retained by the soldiers.³⁵

In Denver, Chivington and his men were received with marked honors. The citizens believed that, on account of this expedition, the Colorado country would be practically secure from Indian attacks. The leader seemed to be recognized as the hero of the hour, and the battle an important and necessary step toward safe conditions. When the excitement passed away, however, and earnest inquiries began to be made, and the details were put before the public, a counter feeling arose on the part of the thoughtful citizens, and Chivington was bitterly denounced by the people generally.

On account of the prevailing indignation, Congress felt compelled to take notice of the affair and demanded an investigation. Accordingly, a Joint Special Committee of the two Houses was appointed on the third of March, 1865, to conduct an inquiry into what was called the Chivington Massacre. This committee summoned the principal actors and observers associated with the whole affair, gathered the testimony of the witnesses, and made a report in the following May. This report unsparingly criticized the conduct of the whites. This censure proved a basis for developing extremely unpleasant relationships among the widely

³⁵ "Of the four or five hundred ponies and mules taken not one head was turned in to the government."—Grinnell, *op. cit.*, 169.

scattered citizens of Colorado, creating enemies out of friends, breaking up harmonious business associations, and bringing to the surface in the political field bitter hatreds and most unfortunate alliances. The friends of Chivington asserted, and doubtless with much truth, that jealousy on the part of subordinate military officers had much to do with the adverse report. Becoming suddenly famous in the successful New Mexico Campaign against the Confederates, in 1862, he incurred the enmity of many subaltern officers who took the opportunity, afforded by the Sand Creek episode, to besmirch his character and belittle his achievements.

Bearing in mind the unimpeachable evidences of discreditable conduct on the part of the soldiers at Sand Creek, and especially the fatal order by Chivington, fairness of judgment, however, cannot disregard the epoch and provocations. It is comparatively easy after a long flight of years, with conditions radically altered and the temper of the times fundamentally modified, to wonder at the frailties of human nature and to theorize regarding the duty of human beings in the abstract. "Advice after mischief is like medicine after death." The viewpoint of the actor and that of the observer must be different. The Caesar whom the gladiator salutes is necessarily far less perturbed than the gladiator himself in the arena.

Here were the settlers, with homes, property, and loved ones, maintaining an existence among numerous enemies of another race and culture, and unable to comprehend a white man's code. Failing to get adequate relief from the government of which they were a part, seeing their neighbors and kindred murdered here and there, and distrustful of good promises made by those murderers, these frontiersmen found little safety except the safety which they themselves provided.

Again, it is but fair to assume that the soldiers who knowingly committed atrocities on that unfortunate occasion were a proportionally small part of those engaged. The group of men that marched over the plains of Sand Creek on that fatalistic November night were largely of the class of ordinary citizens to be found in normal communities scattered over this broad land from the Atlantic to the

Pacific; and, though, through that ill-omened day, there is the unquestionable evidence of the mob-spirit—which has broken out here and there, again and again, in times of great excitement in our peace-promoting country—it is reasonable, nevertheless, to assume that the guilty reprehensible element of those citizen-volunteers constituted but a small fraction of the whole. In this connection, the words of Irving Howbert, who was in the ranks of soldiers in this battle, are worthy of note: "It was utterly impossible, at a distance of two hundred yards, to discern between the sexes, on account of their similarity of dress."³⁶

Although the average man must condemn the taking of Indian scalps by the whites, it is but just to recall that this practice was not solely a mid-nineteenth century diversion, nor confined to the pioneers of the Rocky Mountain regions. One easily recalls the popularity of the gruesome custom on the crime-nursing banks of the St. Lawrence and the Great Lakes, during the days of French possession. In the early years of our country's history, scalping was encouraged by the British.³⁷ Indeed it is safe to state that this practice has been more common than the public has generally supposed it to be.³⁸ Again, even in Colorado the taking of scalps at Sand Creek was not an only instance. In the days before Colonel Gilpin, the Indian fighter on the

³⁶ Howbert, *Indians of the Pike's Peak Region*, 104.

³⁷ "On the third of August they brought in twenty scalps and as many captives; and Burgoyne approved their incessant activity."—Bancroft, *History of the United States*, Centenary Edition, Vol. V, 587.

³⁸ "This custom of scalping was adopted by the whites and extensively practiced, frequently with direct official encouragement, in all the border wars from King Philip's War down to within the last thirty years. The border fighters of a later period invariably scalped their slain Indians when opportunity permitted, and during the Revolutionary struggle both English and American officers encouraged their Indian allies in the practice by offers of bounties and rewards, even, in some cases, where the scalps taken were those of white people. The Mexican Government formerly employed a company of American scalp-hunters against the Apache at the fixed price of one ounce of gold per scalp."—*The New International Encyclopedia*, Vol. XVII, p. 616, 1907 Edition.

Arkansas, had become governor of Colorado Territory, reports of such conduct were in evidence.³⁹

Again, the necessity of killing men, women, and children, in conflicts on the plains and even elsewhere between troops of white soldiers and the occupants of Indian villages, could not be wholly avoided.

The white regiments consisted of selected men, with kindred living perhaps hundreds of miles away in secure homes and under the protection of carefully organized society; while the natives, the warrior and his family, lived in temporary movable abodes, with old and young, parent and child, male and female, robust and diseased, all as companions constantly exposed to attacks from members of their race or other antagonistic human species from any quarter of the globe. One recalls the scores of Indian women and children killed in the various battles with Chief Joseph on that memorable march in the Northwest.⁴⁰ This is only one of many that naturally come to mind. Here, there, and everywhere on those wild limitless western plains, during the troublesome times we are considering, such unfortunate encounters were frequent. There were many skirmishes, accidentally or incidentally, between male squads of each race, out for the purpose of acquisition or recovery of certain kinds of property, especially domestic animals, and occasionally for the more serious business of taking human life; but the history of the times abounds in records of greater and far more significant conflicts between companies of white soldiers on the one hand and the heterogeneous native village population on the other. On the Platte, Smoky Hill, Powder, Republican, Arkansas rivers and their various branches, in the numerous expeditions under the direction and leadership of a score of well known Indian fighters, the deaths of many women and children, in the confusion and recklessness of half-barbarous onslaughts, must inevitably result; but it is safe to

³⁹ "Nine battles were fought from the middle of July to the end of August, and 253 scalps of warriors were taken from first to last."—Bancroft (H. H.), *William Gilpin*, p. 41.

⁴⁰ "In the fight with General Gibbon we lost fifty women and children and thirty fighting men." "Chief Joseph's Own Story," in various publications.

assert that the policy of the average Caucasian officer and his soldiers was to spare the lives of the helpless in the enemies' camps. In contrast to this, the unfortunate and most regrettable Chivington command, that no prisoners were to be taken—an injunction faithfully obeyed and later referred to with pride by the leader himself—stands out in many respects the culminating mishap of this whole memorable expedition.⁴¹

Regarding the beneficial or the harmful results of the Sand Creek exploit on the situation of affairs in Colorado, there has been a wide diversity of opinion. It seems, at least, fair to assert that the citizens immediately breathed easier. After the government investigations and report of the findings thereon, the widows and orphans of the Arapahoes and Cheyennes, as a matter of reparation, were given lands, and were paid for property destroyed when their village was ravaged.

Regrettable, indeed, it was that this same government had not heeded the pleas of Colorado citizens, and come to the rescue a few months or years before, and thus had averted this, the most embarrassing and lamentable incident, in the whole history of the state. If the attitude of the two races toward each other, out in this western country, had received the attention it deserved from the national government, if assurance of sufficient food and protection had been given to the natives and with it the decree that theft and murder would not be tolerated from them, if potential warnings had also gone out to the small mischief-making, law-breaking, parasitic body of whites, intrenched among the highly honored and highly cultured settlers of the state, demanding that they refrain from indignities and outrages against men and women of the aborigines, the history of those times would have formed a very different and

⁴¹ "I have personally listened to the tales of some of the perpetrators of deeds which they themselves committed, that caused my blood to run cold, and forced me to blush with shame that any human being could have been so unhuman, and in two instances they related to the slaughter of women and children who fell into their hands. And their warrant for it was that Chivington had commanded that no prisoners be taken."—Hall, *History of Colorado*, Vol. I, p. 350.

very much more pleasant chapter than the true records furnish. To be sure, no one fails to recognize the great national struggle of that hour and the prime necessity of saving the life of the nation. The fatal tendency at Washington, however, to disregard the vital needs of the Rocky Mountain region—a region that had demonstrated its loyalty to the Union by stemming the tide of invasion during an extremely crucial period, a region already furnishing much needed resources from its gold-ribbed mountains for the treasury of the country—and to let faithful citizens, surrounded by countless natives of a different culture and hostile nature, remain on this far away frontier with the understanding that they must take care of themselves, although a disproportionately large number of home-protectors were on eastern battle-fields, showed, to say the least, an uncommendable disregard of duty.

The echoes of the Sand Creek event had hardly died away before new war whoops were heard not only nearby but far out on the extended plains, beyond the boundaries of the state. The tribes united and terrorized both the permanent and the itinerant sojourners of the soil. Life and property were threatened. Stage stations along with the keepers of them were destroyed, telegraph lines were put out of commission, livestock was confiscated, coaches and any other chance vehicles were attacked and the passengers killed, transportation of necessities across the plains was so endangered that the price of food stuffs became exorbitant. Usually quiet during the winter months, the infuriated Indians were so exceptionally active and cruel during the winter of 1864-5 that acting Governor Elbert issued a proclamation calling upon the inhabitants for armed volunteers to meet the crisis. The response was discouraging, for the Sand Creek affair had so thoroughly worked its way into the minds of the people and so thoroughly created factional strife that immediate and vital duties were neglected.

Colonel Chivington had been succeeded as military commander of the Colorado District by Colonel Thomas Moonlight of Kansas. The new leader at once asked the legislature, then in session, to make amendments to the militia law, in order to render it more effective; and, when the

law-making body wasted time in debate for two weeks and accomplished nothing, he became impatient on account of the delay, proclaimed martial law, closed the business houses, prohibited work in mills and mines, and brought on, at once, industrial stagnation. His demands then went into effect immediately. Seven companies were speedily recruited, and made their presence felt.

Important events followed one another speedily. In February General G. M. Dodge was placed in command of the department of Kansas, of which the territory of Colorado was a part. Within a few weeks the military districts of Utah, Colorado, and Nebraska were consolidated into one, which was placed under the command of General P. E. Connor.

As we have seen, the battle of Sand Creek was fought during the last days of November. For the three following months there was a series of constant and most maleficent encounters between groups of the two races, to follow the details of which would require a large volume.

Two lines of travel from Julesburg—one up the North Platte to Fort Laramie, the other up the South Platte to Denver, both linking a half hundred stage stations and important ranches with one another—were overrun and despoiled during those tempestuous winter days. As the spring came, effective work by General Dodge in opening the trails along the Arkansas and Platte furnished relief here and there. The closing of the Civil War brought some assistance also, through the transfer of soldiers to the western frontier and the establishment of military posts at various points for protection of travel. At the same time, this bringing of soldiers, workingmen, provisions, mechanical supplies, railroad-building machinery, and other necessary adjuncts to civilized society, among these swarms of enraged denizens of the desert, naturally stirred up deadly hostility. The appearance at this juncture of several prominent generals released by the closing of the Rebellion—Sheridan, Custer, Hancock, and several others—offered an opportunity for breaking up the conspiracy that extended over an area equaling that of a large-sized empire.

The establishment of a line of military posts in the direction of Montana caused fresh outbreaks. In Decem-

ber, 1866, a large force of Sioux Indians under Red Cloud suddenly attacked a party of soldiers and laborers near Fort Phil Kearny, in Wyoming, and killed every one of the ninety-four⁴² white men, including Colonel Fetterman, which encounter became known as the Fetterman Massacre. In the early part of the following year the troops retaliated by attacks, and especially by burning a Cheyenne village in Western Kansas. "The Cheyennes flew to arms, and a bloody war followed costing the lives of over three hundred soldiers and citizens."⁴³ In 1867, the Cheyennes and Arapahoes were moved from their land in Colorado to Oklahoma. This was an important event, since it virtually marked the end of real occupancy of Colorado by these wild tribes of the plains. During the next year, however, various bands led by Cheyennes ravaged the western plains of Kansas. General Sheridan was given command of the troops on this territory, and established his headquarters at Fort Hayes, which marked the terminus of the Kansas Pacific Railway.

In the middle of the summer, several Cheyennes and Arapahoes crossed Eastern Colorado, killed settlers on the Bijou and Kiowa creeks, pushed on up through Ute Pass making an attack on the mountain tribes in South Park, returned at once to the plains, killed several whites in the vicinity of Colorado City, ran off herds of live stock, and escaped.

Following this series of events, lasting through several years, an event of extraordinary importance marked the climax and closing of this hostile racial interrelationship on the plains.

The Arikaree, otherwise known as the Middle Fork of the Republican, is one of those western water-courses which, as a matter of courtesy, are called rivers. Its sources are found on the northern slopes of the Platte-Arkansas Divide, seventy miles to the northeast of Pike's Peak. On that dry upland, in the vicinity of its stinted head waters, the ordinary river-supplying agencies, such

⁴² Reports differ regarding the exact number, but all the whites were killed.

⁴³ E. Parsons, *The Making of Colorado*, 206.

as springs, fountains, and seepage drainage, are exceedingly rare and unpretentious. The river water, therefore, under normal conditions, manifests the same lack of profusion. The course of the Arikaree is in a northeasterly direction, where, passing over a distance of one hundred miles, it empties into the Republican, in Nebraska, just after leaving the Colorado State line.

Like its neighboring streams, this river moves very leisurely over the gently sloping land, its thin, scanty waters, here and there, crossing and recrossing the broad sandy bed, in places several hundred feet in width, which, in the course of time has been scooped out by angry waters in times of flood. Along the edge of the quietly moving current, coarse grasses and healthy rushes grow in considerable profusion, nearly covering the narrow body of mid-summer water and giving the impression that the stream is much too small for its clothes.

Today, the quiet cattle crop the herbage along the banks, and water birds wade in the fringing pools, presenting a picture most notably in contrast to that of those days when vast herds of shambling buffalo and troops of soft-eyed antelope sought the waters to alleviate the torments of a prairie-born thirst. Back and forth across that wandering stream and over the heath lands extending far out in every direction, long before the report of a white man's rifle had rung out on the quiet air, the native nomads of the plains, with their noiseless tread and silent weapons wandered at will as lordlings of the soil, except when molested by intruders of their own race.

The great unbounded plainsland of the Central United States presents a noticeable change of features in North-eastern Colorado. The smooth surface, predominating in most of the other sections, gradually assumes there a more billowy appearance. Bluffs of various heights, separated by shallow dales, wide valleys, or deep ravines, give to that country a suggestion of ghostly haunts and mysterious retreats.

The discovery of pay-gold in Colorado in 1858 was serious. The white men came in multitudes, and the buffalo began to disappear in multitudes. These animals constituted the red man's chief food. Stealing the cattle and

other property of the white man, and making murderous raids upon unprotected settlers brought on regrettable conflicts, accompanied by torture, deaths, mutilations, and almost unbelievable indignities toward defenseless women and children. The battle at Sand Creek, in 1864, with all its shocks and surprises, became the nine days' wonder of the times. Bitterness between the two races grew apace. Conspiracies, stage hold-ups, cattle raids, and dastardly murders were reported, here and there, over the whole territory between the Missouri River and the Rocky Mountains.

By the year 1868, there had been no cessation of hostilities. Soldiers serving in the Civil War had been released from fighting on southern soil, and the government was watching matters in the West. Regiments were sent to the frontier, commanded by experienced efficient officers. Sharp encounters between troops and natives took place, and not always with overwhelming victories on the part of the whites; for the Indian, accoutred with rifle and ammunition, hanging on the unexposed side of a galloping horse and firing with astonishing accuracy across the neck of the animal upon an antagonist, is to be rather avoided than encountered.

Along with other enterprises of the day, the Union Pacific Railroad was rapidly pushing its way across the continent, and directly through those most excellent hunting grounds of the Middle West. The result, on the life of the buffalo, of noisy trains filled with instruments of destruction in the hands of ever increasing restless men, could be safely conjectured, even by the untutored wild-meat consumers on the Arikaree. For just ten years the gold-seekers had been crossing the plains to the Rockies, and for those ten years, the same class of strangers, in constantly augmenting numbers, had, step by step, come to array their strength against the gradually uniting tribes of that whole region—tribes with equipment much improved and unmistakably formidable for contesting racial supremacy.

Assured of the necessity of more strongly organized forces, to protect the white population, the military department of the Missouri River had been established, com-

manded by General Philip H. Sheridan, with headquarters at Fort Leavenworth. Serving on Sheridan's staff was Colonel George H. Forsyth, who had expressed, several times, his discontent with the routine life which had fallen to his lot, and his desire to exchange it for more active service. General Sheridan, complying with his request at the first opportunity, gave him permission to employ fifty frontiersmen as scouts for special service. These men were the best of their kind, accustomed to the frontier, many of them having served in the army and all being excellent marksmen. Mounted on good horses, well equipped with weapons, unencumbered by regular army baggage, this body of men seemed especially fitted for the border warfare before them.

Second in command was Fred Beecher, a nephew of Henry Ward Beecher, a man already distinguished for honorable service in the Civil War, and carrying scars resulting from action on the field of Gettysburg.

On the twenty-ninth of August, within five days after Colonel Forsyth had received his commission, the troops were enrolled and equipped for their dangerous tasks. Orders from General Sheridan were received that the company should immediately leave Fort Hayes, where it had been organized, cross the head waters of the Solomon to Beaver Creek and pass on to Fort Wallace for further orders. Reports of near-by Indian depredations reached Forsyth at the fort, to each of which he gave due attention; but, in the midst of numerous trails and unmistakable signs of recent activities, he pushed on in a northwestwardly direction. Here he discovered a large fresh trail which he followed to the north side of the Republican River, where several smaller trails, uniting with the larger ones, terminated in a wide well-beaten path over which a vast number of cattle and horses had been recently driven.

Following the trail with eagerness and caution, the company came, on the sixteenth of September, to the Arikaree at a point within a few miles of its junction with the Republican, and at a distance of fifteen miles south of the site of the present town of Wray.

In 1868, an island, in length somewhat over two hundred fifty feet, and, in width about thirty, had in process of time

been formed, which today has disappeared. The chief current, even then, must have been on the northern side of the island. A shallow groove, now covered with grass, discloses where the southern edge of the island lay, at the time we are noting. The valley here is comparatively shallow, but out some distance away from the river on both sides are bluffs; and, especially to the north and northwest, at a distance of several hundred yards from the island, stands a moderately elevated bluff which then was destined to assume unusual importance in the few subsequent days.

Forsyth, coming from the southeast into the valley at a rather early hour in the afternoon and noticing attractive grasses suitable for horse-feed, decided to camp on the north side of the stream for the night. The decision was providential, for it was learned afterward that an ambush had already been carefully prepared, into which, at a distance of about two miles in advance, the troops would doubtless have been drawn and hopelessly slaughtered.

It seems that Forsyth had a suspicion that an attack would be made on the following morning; therefore he increased his sentries, placed them in most advantageous positions, and ordered the men to sleep with weapons loaded. Vigilantly he passed that restless night, and, at the very break of dawn, he called the attention of a sentry to moving figures on those northern bluffs. In a few minutes hundreds of galloping Indians came within a short distance of the camp. With an unearthly chorus of shouting, screaming, drum-pounding, and gun-shooting, they rushed as closely as prudence dictated up to the camp, with the hopes of frightening the horses and confusing the men; but they were thwarted by the steady withering fire of the troops, and fell back. In the interval Forsyth ordered his men to retreat to the island, which was done in haste and good order. This move the Indians had evidently not anticipated. Before means of protection could be devised, however, hordes of the enemy were back upon them determined to drive out the little group of defenders, and to scatter and kill them one by one, but the steady fire from the island again drove them back. In the brief interval that followed, the horses were led to the edge of the island, tied securely as possible to the rank bushes, and, behind these, sand pits

were dug, the men using knives and tin plates as utensils for constructing them. While settling himself into one of these Forsyth was wounded in the right thigh. Among the men a difference of opinion in regard to the advisability of leaving the island began to grow, but the unqualified declaration from the commander that anyone attempting it would do so at his peril, settled permanently the proposition. The Indians, infuriated at the failure of their onsets and their mistake in neglecting to have taken possession of the island as a preliminary measure, renewed the attack with frenzied determination. Members of the heroic little band were being wounded and killed one by one, while the innocent horses, serving as targets and barricades, frantic with fright, jumping and struggling, moaning and dying, helped to create a scene hopelessly beyond the power of painter or poet to depict.

Forsyth, watching and commanding, was wounded below the knee, the bone being broken; and a third bullet struck his head, slightly fracturing the skull and rendering him temporarily insensible. Along with other casualties, the surgeon of the company, J. H. Moores, while giving assistance to the wounded commander, was shot in the head, but lingered in his sand pit till his death on the third day.

Along the north edge of the river today, a rather wide fringe of marsh grass grows, as was the case in 1868. It served as a buffer between the scouts on the island and the field beyond, containing the thousand Arapahoe, Sioux, and Cheyenne warriors.

For half the forenoon the fighting had continued, and the steady fire of the scouts had been a surprise to the enemy who not only outnumbered their opponents twenty to one, but had managed recently to come into possession of the latest kinds of civilized man's weapons. Back on the bluffs were the old men, children, and women, constantly chanting and gesticulating in order to stimulate the braves to action. The ammunition of the whites was not over plentiful, so useless firing had to be avoided.

New movements on the part of the Indians indicated that preparation on a gigantic scale was taking place. The scouts reduced from fifty fighting men to two-thirds of that number prepared carefully. Every living or dead

man's weapon was loaded, and placed where it could be used most conveniently and effectively. By order of Forsyth, firing was to be done in volleys, and each scout governed himself accordingly.

The plan of the Indians became self-evident. It was to mass hundreds of their best armed warriors into one body that was to move like an avalanche over the dry solid ground, plunge through the marsh and sandy bed of the river, leap upon the island, and shoot or ride to death the sand-pit occupants.

In a somewhat secluded spot back near the bluffs, more than three hundred picked warriors, in six ranks of about sixty each, nearly naked and in war paint, were formed for the onset. They were directed by one of the most distinguished leaders⁴⁴ of the Indian race, Roman Nose, who had formerly been on friendly terms with the whites, even after many signal battles had raged between bands of the two races, but he had recently cast his fortunes with his own kind of people.

At this juncture of the battle, the brave defiant chief addressed his warriors, pointed toward the island, and, with his men, galloped toward the scene. Nothing can surpass Forsyth's description, in Harper's Magazine, written in later years: "As Roman Nose dashed gallantly forward and swept into the open at the head of his superb command, he was the very beau ideal of an Indian chief. Mounted on a large, clean-limbed chestnut horse, he sat well forward on his bare-backed charger, his knees passing under a horse hair lariat that twice loosely encircled the animal's body, his horse's bridle grasped in his left hand, which was also closely wound in its flowing mane, and at the same time his rifle at the guard, the butt of which lay partially in front of his body, rested slightly against the hollow of his left arm, leaving the right free to direct the course of his men.

"He was a man over six feet and three inches in height, beautifully formed, and save for a crimson silk sash knotted around his waist and his moccasins on his feet, perfectly naked. His face was hideously painted in alternate lines

⁴⁴ According to Grinnell, Roman Nose was a great leader but not a chief as he is sometimes distinguished.—*The Fighting Cheyennes*, 271.

of red and black and his head crowned with a magnificent war bonnet, from which, just above his temples and curving slightly forward stood up two short black buffalo horns, while its ample length of eagles' feathers and herons' plumes trailed wildly on the wind behind.

"Turning his face for an instant towards the women and children of the United tribes, who by thousands were watching the fight from the crest of the low bluffs back from the river's bank, he raised his right arm and waved his hand with a royal gesture in answer to their wild cries of rage and encouragement as he and his command swept down upon us; then, throwing back his head and glancing skyward, he suddenly struck the palm of his hand across his mouth and gave tongue to a war-cry that I have never heard equalled in power and intensity."

Roman Nose, according to Forsyth,—whose account is here rather closely followed—twirling his rifle around his head rode in front of his body of men near the middle of the first line, while the medicine man rode also in advance of the same body but at the extreme left.

With responding whoops and yells on the part of the charging warriors, accompanied with jeers, taunts, and blood-curdling yells from the women on the bluffs, the band came within firing distance of the island, and the battle began. "The first volley," says Smiley in his *History of Denver*, "brought down an Indian for every gun, but did not check them; the second made them falter and the five succeeding ones stopped and turned them back pell-mell leaving the ground strewn with their dead and wounded braves and horses." The medicine man fell dead at the fourth volley, and Roman Nose at the fifth, when horses were plunging, rearing, falling and dying with riders dead and alive, entangled on the narrow grassy marsh and in the soft miring sands of the river bed.

The embarrassment experienced by warriors when the chief or medicine man dies is well known to students of Indian history, and the temporary discouragement at the loss of these two men was in evidence immediately on that seventeenth day of September. The surviving warriors swerved this way and that, and individually sought safety beyond the range of rifle shots.



UPPER: BEECHER ISLAND, SHOWING MONUMENT, GRAVES,
CANNON AND RIVER AT EXTREME RIGHT

LOWER: ARIKAREE RIVER, WITH BEECHER ISLAND AT LEFT,
MARSHES ON EACH BANK, AND HISTORIC BLUFF
ON THE RIGHT

Out in sheltered nooks away from the island, were ambushed Indians lending aid to the more active warriors, by giving encouragement and firing upon the entrenched men from every direction. This fusilade was helpful to the Indians, to the extent of killing two and wounding several of the scouts.

In the middle of the afternoon the Indians, after consultation, drew themselves together and made another charge in mass, without arranging themselves in rank; but the galling unfaltering discharge of guns from the island they could not withstand, and hence they retired. Nevertheless, between five and six o'clock, another attack was made. Having again formed themselves for action in a recess of the bluffs, taunted and stimulated by the women, with all the impetuosity of the race and with a determination to avenge the deaths of their lost heroes, the warriors rushed with wild fury down to the island, but the scouts, better prepared than before to meet them, cut them down with such completeness that they broke off reaching the island and sought safety in less exposed quarters.

Later, on that same day of apprehension and terror, Lieutenant Beecher left his sand pit, staggered over to the side of the wounded Forsyth and quietly said, "I have my death wound, General, I am shot in the side and dying." Forsyth remonstrated, saying that it could not be so bad as that, but the dying man replied, "Yes, good night." Sinking back unconscious, in a few moments afterward, he was heard to murmur, "My poor mother." Lingering in a delirious state, he gradually grew worse, and, at sunset, expired.

A copious rain fittingly ended that day. Twenty-three of the half hundred scouts had died or were wounded. All the horses had been dead for hours. In the dark the barricade of slain animals was reinforced by saddles and other luggage. Water was obtained by digging a hole in the sand, into which the seepage drained. Almost without food when coming upon the island, they were at once reduced to raw horse flesh, and, in preparation for a siege, they cut large steaks and buried them in the loose soil to prevent them from putrefying.

Forsyth thought that if he could get word to Fort Wal-

lace at a distance of one hundred miles eastward on the Republican River, relief would come at once. There was no dearth of volunteers ready to undertake the perilous journey, although loss of life would seem almost certain in taking such a risk. After due consideration, Jack Stillwell, a plucky boy of seventeen, and Pierre Trudeau, an experienced trapper, left the island shortly after midnight having made mocassins out of their boot tops in order that the tracks of a white man's boot might not be observed by the ever-vigilant enemy.

Knowing that sentries of the suspicious foe would be stationed on every secret route likely to be followed by them, the scouts, with something resembling blankets thrown over their shoulders, cautiously moved over the ridge toward the South Fork of the Republican, being constantly within sound of the enemies' voices and compelled often to stop and conceal themselves in order to allow stray Indians to pass. Sunrise found them but three miles away from the island, and further traveling before nightfall was impossible, so they remained hidden.

Over on the north bank of the river, through the long night, the Indians, under the veil of darkness, were gathering the bodies of their dead and carrying them to the encampment, amid the beatings of their monotonous drums and the lamentations of the mourners. In the early dawn of the second day a reconnoitering party, surmising that the whites had deserted the island, came rushing toward it, and would probably have been annihilated before getting away, if one of the scouts had not by accident prematurely fired his gun, the discharge of which frightened back the assailants.

Fighting from ambush continued as the morning wore away but all signs indicated that the plan of the enemy was to starve out the scouts. The wailing of women and the beating of drums continued day and night.

In the haste to reach the island, the medicine kit had been left behind and had later fallen into the hands of the enemy, so, through those long tedious hours, the suffering of the wounded was marked. In the evening, the uncertainty of reaching Fort Wallace on the part of the two messengers sent out on the first night caused some appre-

hension, so two more men hastened away upon like mission. Returning after an absence of four hours, they reported that every outward passage was guarded.

The third day was cloudy and cooler, hence the more comfortable for the wounded. On this day Surgeon Moores, who had been mortally wounded on the first day of the fight and had lingered unconscious, passed away.

Soon after midnight, Forsyth, having written to the commanding officer at Fort Wallace, stating the situation, despatched John Donovan and A. J. Pliley with the letter; and, since they did not return, he felt that they were successful in getting by the enemies' guards.

On the fourth day, according to Forsyth's report, the suffering was greatly intensified. The heat was suffocating, the meat had become putrid, the stench from the dead horses was almost unbearable, and some of the wounded were delirious. Forsyth, with fractured skull and a broken leg, was in addition suffering excruciating pain from the ball in his right thigh, and asked some of the men to remove it; but on account of its being close to an artery they were afraid to attempt it. Taking his razor from his saddle pocket, and getting two of the men to press the flesh back, he cut the ball out successfully.

The Indians continued to fire from their ambuscade, but less and less frequently as the day wore on. By evening most of the enemy had disappeared, and the fighting was practically at an end.

Inaction, however, along with other embarrassments, was almost unendurable. The putrid horse flesh was boiled but could not be eaten. A little coyote was shot, and even the head was boiled three times in order that no nutriment should go to waste. On the fifth and sixth days some of the company cautiously ventured down the stream in quest of game, but were unsuccessful. Finding a few wild plums, however, they cooked them and passed out the scanty supply to the wounded.

At the end of the sixth day, Forsyth, feeling that the danger from Indians was much lessened, called together the uninjured men, and reminding them of the uncertainty of the fate of the messengers sent to Fort Wallace and the possibility of no relief, gave them permission to depart,

and leave the wounded to take their own chances. This proposition was not sanctioned, the men declaring that since they had all fought together, they were willing to die together, if necessary. Some of the men were very delirious and gangrene had begun its deadly work. Forsyth, examining the wound in his leg, found it infested with maggots.

Two more days, of seemingly interminable length and most intense suffering, passed. No game was secured, although the crafty wolves, keeping out of rifle range, sought the stray carrion, and howled among the bluffs.

On the morning of the ninth day, someone pointed to moving objects, on the distant hills, which proved to be a troop of cavalry under Lieutenant Colonel L. H. Carpenter from Fort Wallace, and, in the words of Forsyth, "then went up a wild cheer that made the little valley ring, and strong men grasped hands, and then flung their arms around each other, and laughed and cried, and fairly danced and shouted again in glad relief of their long-pent-up feelings." Upon receiving news of the situation, through Donovan and Pliley, and later from Stillwell and Trudeau, aid had been immediately sent on, and the battle of Beecher Island, with all its tragedies, became an immortal episode of Colorado history.

The next arena into which the western members of the two opposing races were drawn for momentous encounters was within a mountainous region, and the conflict was between the white settlers and the native mountain occupants, in distinction from those of the plains.

The conscientious Caucasion, taking an unselfish interest in the Indian and wishing to do something for his benefit, has striven, from time to time and in many ways, to accomplish this, but with varying results. Down through the history of our country, famous episodes—John Eliot producing for his native converts an Algonkin Bible, William Penn before the Lenape camp fire with his peace treaty, and scores of other noted alliances, compromises, and educational or philanthropic ventures—have characterized that long-continued strangely diversified relationship. The vicissitudes on the White River Agency in the seventies exemplify misdirected impractical philanthropy between

two grades of culture, each unable to comprehend the motives of the other.

After the prolonged racial disturbances on the plains had gradually died away through the inevitable supremacy and triumph of the white race, the restless aggressive Utes of the Western Colorado slope began to stir up fresh and serious trouble. The history of the times, as gathered from contemporaries, ascribes much of this unfortunate disorder to the laxity and indifference of the Indian Bureau.⁴⁵

Ignorant of the white man's way of doing business generally, incomprehensive of the intricate forms and methods of civilized people, angry at long delays especially in the matter of food deliveries, this untutored tenant of the mountains impatiently watched and waited for promised favors that never came, and he grew resentful at long delays.

For ten years the discoveries of precious metals in the Rocky Mountains had been continuously heralded to the world, and the frontiersman, adventurer, and miner had begun to appear here, there, and everywhere. The coming of these men naturally brought discord, and changes were made to meet the situation. By a treaty, in 1868, Chief Ouray and his group had been settled on the Uncompahgre River, and by the same document Chief Douglass and his band on the upper reaches of the White. As the value of the rich mining regions became better known, annuities were granted to those natives that had thus surrendered their valuable lands. Tardiness in the matter of furnishing the promised goods to the hungry natives, as the months and years went by, added fuel to the flame. At Rawlins, Wyoming, a warehouse was built for storing Indian supplies brought over the Union Pacific Railroad where they lay for long periods without being shipped farther. The penalty of neglect in the matter of supplying the hungry impatient bands with merchandise long due, was often experienced and constantly feared by the employees at the

⁴⁵ "The management of Indian affairs in those years was corrupt or inefficient nearly everywhere in the West. Supplies for the Utes were long delayed; the game was fast disappearing, and the Indians had upon more than one occasion been reduced to destitution."—Smiley, *History of Denver*, 466.

Rocky Mountain end of the line; but at Wasnington there seemed to be constant tardiness, and the sullen would-be recipients growled louder and louder from month to month. "The Indians complained to the agent, and he to the Governor, and he in turn to the department, but in vain."⁴⁶ The government, however, to its credit, did supply the malcontents with numerous cattle, sheep, and horses; and these flourished under the supervision of the authorities in charge of the agencies. Privileges and practical supplies at home, however, did not satisfy the instinctively restless mountain barbarian; and the disappointment at not receiving at stated times the commodities for which he had given up his marvelously rich mineral lands and productive hunting grounds inflamed more and more his ever present resentment.

On the White River Reservation were several troublesome Indians and these were frequently joined by disagreeable members from the Uncompahgre Reservation in infamous raids out away from reservation authority. More than this, unscrupulous whites furnished these Indians with plenty of whisky and firearms. On a foray into Eastern Colorado a settler named Louis MacLean was murdered, and, among many other depredations, a ranchman's home in Middle Park was set on fire.

In 1878 a humanitarian recently from the East, formerly associated with Horace Greeley on the Tribune and one of the founders of the Greeley Colony of Colorado, highly educated, strictly conscientious, and a man deeply interested in the welfare of this new state and the original inhabitants, was appointed at his own request to the position of agent at the White River Agency. His name was Nathan C. Meeker, from whom the present capital of Rio Blanco County has derived its name. Imbued with the spirit of philanthropy and having confidence in his ability to change the life and character of those wild mountaineers, he began his experiments with high hopes and great expectations. The times and conditions, however, were unpropitious, and the good intentions of the experimenter were fruitless. To change from the life of the hunter to that

⁴⁶ Hall, *History of Colorado*, II, 495.

of agriculturist, to push a group of people of a barbaric ethnic culture up into a highly conventionalized circle of society and expect them to adopt, within a few months, the rules of conduct demanded in a new environment is likely to result disastrously through ignorance, inaptitude, bewilderment, misunderstanding and obstinacy. To act without restraint or formula was in the nature of the red man, and to exchange the occupation of shooting wild game, engaging in horse-racing, and gathering the scalps of enemies, for the dull pursuits of cultivating the soil and doing the humble work required about the farm house, could hardly be expected.

With the utmost faith in the success of his projects, however, this high minded enthusiast led, from the fringes of civilization into the wilderness, his wife, one daughter, and about a dozen of more or less skillful white helpers to discipline and assist large groups of intractable dusky natives whose destinies he had taken upon himself to guide. No sooner had he entered upon his new duties than trouble arose. His theories and plans were not kindly received, and he was persistent—perhaps over persistent—to make them successful. The Indians refused to submit to his orders, broke his rules and went off the reservation at times to commit depredations. Following this, letters from the settlers were sent to Meeker and to Governor Pitkin demanding that the Indians be kept on the reservation and remain orderly. The agent, however, was unable to control them, and conditions rapidly changed from bad to worse. Colorow, Washington, Captain Jack and other notorious chieftains took matters largely into their own hands and mistreated Meeker and his assistants. Realizing his helplessness and anxious concerning the safety of the whites, he reported to the United States Government the necessity of military protection, and appealed for aid to the Colorado governor. Under instructions from Washington, Capt. Frank S. Dodge, with a cavalry company of fifty colored soldiers from Fort Garland in the San Luis Valley, went into Middle Park to protect the white occupants of that region and to keep the Indians within the reservation. The Utes were not awed by the presence of the negroes—"buffalo soldiers" as they called them—and did not refrain from

mischief. Attempts to arrest the ringleaders resulted in still greater enmity between the two factions. Meeker himself was assaulted by "Johnson," a medicine man, and would have been killed if rescuers had not opportunely appeared. Other white men about the agency were terrorized, and were advised to leave the country to avoid the risk of being killed. In the early autumn of 1879 the Indians began a war dance at the agency which, of course, was emphatically disfavored by Meeker, but did not cease on account of his disapproval.

In the midst of these serious activities, through appeals of Governor Pitkin, General Sheridan set about to furnish protection to the agency. At Fort Steele, near Rawlins, Wyoming, an expedition consisting of four companies, three of cavalry and one of infantry, in all 160 men, was organized and placed under the command of Major T. T. Thornburg. Marching directly toward the agency, the soldiers were met at Bear Creek, some sixty-five miles from their destination, by ten Indians headed by Colorow and Captain Jack, the latter one of the most prominent leaders of the recalcitrants. Jack had been reared in a Mormon family and consequently was able to speak the English language, thus possessing qualifications and advantages much superior to those of the ordinary Indian leader. Learning that the expedition was on its way to the White River Agency, the two chiefs, claiming to be out on a hunt and professing friendship, offered to escort Thornburg with five soldiers to the agency to discuss the Meeker regime and the troubles growing out of it, before the soldiers should be allowed to enter on the reservation. Thornburg, suspecting treachery on the part of his visitors, declined the proposition, and proceeded on the way with his command. In the forenoon on the twenty-ninth of September, at a distance of about twenty-five miles to the northeast of the agency, Thornburg and his troops were ambushed while passing through a deep ravine that crosses Milk Creek. The Indians lined the bluffs on either side, and, from advantageous positions, while giving utterance to blood-curdling war whoops, fired down upon the moving troops. A body of the red men rushed in behind the marching soldiers and cut off the wagon train of supplies which was bringing up



CHIEF OURAY, CHIPETA, GENERAL CHARLES ADAMS
Photograph made in Washington, D. C., 1878

the rear at a distance of several hundred yards. Thornburg, with a score of mounted men, wheeled about and charged upon them, whereon he and thirteen of his faithful followers met death immediately. The survivors fought their way to the wagons, behind which they, with others of the expedition, gathered, and around which the fierce fighting raged. Captain Payne, taking command immediately after the death of Thornburg, ranged some of the wagons in the shape of an oval and used them as breast-works. Firing from the pits and crevices of the bluffs on the part of the 300 armed Indians was extremely intense and constant, in the midst of which more than one hundred and fifty horses and mules were destroyed. Every officer but one had been killed or wounded at the close of that memorable day. To secure better protection, the contents of the wagons were piled up and even the carcasses of the animals and corpses of soldiers were used. Within the main enclosure a pit was dug, into which the seriously injured were carried, while the surgeon, himself one of the wounded, administered to the sufferers, and directed the administrations of others. There was no escaping from this trap in any direction, and the hostiles later set fire to the tall grass and sage brush on the windward side with the expectation of driving the soldiers, one by one, from the intrenchment, or of suffocating them. Though deprived of water, the soldiers by using blankets and other fabrics managed to keep the fire down sufficiently to prevent smothering. Just before night, Jack sent a squad of the Indians to charge upon the besieged men, but they were repulsed. At ten o'clock in the night Joe Rankin, a courageous scout, stole away from the camp, mounted a strange horse, since his own had been killed, and rode over the north trail to Rawlins, 160 miles away, in twenty-eight hours.

A clear beautiful day dawned after an ugly night of suspense, and labor was begun in the way of increasing the security of the fortifications and in making conditions as comfortable as possible; but the groans of the dying, the moanings of the wounded, and the plaintive cries of the stricken horses filled the air with dreadful disheartening sounds. The hollows in the ground had been increased in

number and deepened to give greater protection. The wagons and dead bodies had been moved and arranged to give greater security. "There were seventeen pits in all, about seventy feet long, two and a half feet wide, and two feet deep, with breast works ranging from two to four feet above the opening and at its sides. In the center of the pits were forty-three wounded men, including a few settlers. One hundred soldiers occupied the pits and over two hundred and fifty dead animals surrounded the corral. There were two lookouts to each pit, making thirty-four men constantly on guard, through oddly fashioned loop-holes, in some instances made through the body of a horse."⁴⁷ The day wore on, and sharp-eyed Indians with excellent rifles fired carefully directed bullets at every suspiciously moving object.

In the evening, another courier took his life in his hands and galloped out over the trail in search of aid. During the next day the same general state of affairs prevailed, though the stench from the bodies of the dead was becoming offensive. At night under the cover of darkness, water in considerable quantities was conveyed from the river to the camp to the relief of all.

The third day was ushered in under disheartening auspices. The mass of dead comrades and horses seen in the rays of the rising sun, with wounded men suffering, moaning and dying, created a sickening sensation.

In the midst of these distressing scenes, Captain Dodge, who had been intercepted by couriers, had hastened through Middle Park with his colored troops, arriving just at daylight within the cañon. Dashing across the open space for a distance of a thousand feet, while the bullets from the enemy fell thickly about them, the troops reached the pits, found shelter, and not one received a wound. To that small besieged group those reinforcements gave encouragement rather than security, but Rankin's report brought Gen. Wesley Merritt with an adequate body of soldiers quickly across the country. While the troops were waiting, during those terrible days, the Indians never ceased to watch for human targets, but the whites were prudent and

⁴⁷ Dawson, *The Ute War*, 32.

hence the casualties slight. Horses struck by bullets often broke away and in fits of frenzy stampeded and endangered the lives of the men in the pits. Less firing was done by the Indians at night, and so this interim was taken advantage of for carrying away the decaying dead bodies of man and beast to relieve the putridity of the atmosphere. The customary starlit nights and the sun-diffused days of the Rocky Mountain autumn succeeded one another with painful monotony.

At daybreak on the fifth of October, after a siege of six days, General Merritt arrived and the Indians immediately vanished. As this renowned officer of many battles looked upon the sickening sight his eyes filled with tears. Merritt's soldiers remained about the camp for three days, taking a much needed rest and caring for the dead and wounded. The expeditions of Colonel Dodge with his colored troops from Fort Garland and of General Merritt from Rawlins had been made with such speed and efficiency that they will stand out forever among the most noted of their kind in Colorado history.

Following the wagon road leading to the agency, Merritt found that Indians had gone up Milk Creek Cañon for a short distance and stationed themselves on the bluffs, among which it was necessary for the army to pass. With no artillery at his command Merritt realized the inadvisability of attempting to dislodge them under such disadvantageous circumstances and waited for reinforcements. The enemy, obtaining news of these plans and receiving orders from Ouray to desist from fighting, suddenly left the vicinity, and Merritt hurried on to the Meeker agency, which he reached on the eleventh of October.

Unpleasant indeed were the scenes and the news that awaited him; but, before reaching the destination there must have been a premonition of what would probably be found; for, along the road stray travelers, soldiers, and several employees of the agency, on the way to and from the markets with merchandise, were found dead and fearfully mutilated.

Sad indeed was the story disclosed when the troops reached their objective, the ill-starred agency on the White River where it hurries through Powell Park.

On that same dark day when Thornburg and his men were ambushed on Milk Creek, an attack was made on the agency by Chief Douglass, leading a band of about twenty-five Utes. The twelve white men were killed, stripped of most of their clothing and brutally mutilated. "An iron chain, the size commonly known as a log chain, was found encircled about Meeker's neck, and a piece of flour barrel stave had been driven through his mouth."⁴⁸ The bodies of the other men were scattered about in the vicinity. The buildings were nearly all burned and the valuable movable property carried away.

Those taken as captives consisted of Mrs. N. C. Meeker, wife of the dead agent; Miss Josephine Meeker, the daughter and teacher; Mrs. E. Price, wife of the murdered blacksmith; May Price, the little daughter, aged three years; and Johnnie Price, the baby son, aged eighteen months. When the Indians appeared and began to shoot the men, these five sought refuge in the milk house, which was soon set on fire, and the occupants were obliged to leave it. They rushed away into the fields, hoping to escape through the sage brush while the murderers were engaged in packing annuity goods and other stolen property upon their ponies. Having been seen, they were captured immediately, amid showers of bullets from this wild, yelling, excited band of terrorizers. Subjected to indignities from the murderers of their kindred, this group of five, mounted on the backs of ponies and caring but little whether death was near or far, moved away in a procession, that night, from those scenes which, within a few hours, had been changed from a lovely prospect to a charnel spot toward which wild wolves and hungry ravens were already speeding. Liquor had been taken from the agency medicine stores, and so the usual insecurity to be expected from this band of malefactors was greatly increased with their brains inflamed by whiskey. The mountain trail over which they passed was rough and winding, and the prisoners were constantly subjected to rude remarks, and villainous recitals concerning the character of the whites who had been killed at the agency. This was particularly true concerning Agent Meeker. The chief personages of the party were Douglass,

⁴⁸ Ibid., 56.



(Courtesy Denver Tourist Bureau and Magazine, Denver)

UPPER, OURAY; LOWER, GLENWOOD SPRINGS

Persune, Johnson and Jack. Their course took them over the trails leading through the Grand Mountains, always romantic and especially so in the light of the full moon, as on that occasion, but ghostly and ghastly to the suffering prisoners on that dreadful night. Throughout the journey the women were all kept separated. Camp was pitched in the night and a short rest was taken, to be broken very early by a runner announcing the Thornburg battle toward which Douglass and the larger share of the men started immediately. On the next day the camp was moved about a dozen miles into a beautiful valley with high grass and a charming stream of water. Having received orders from Ouray at the Milk River Cañon to stop fighting, the Indians of this band were practically all back in three or four days. Councils and war dances comprised a large part of the daily program as the procession moved from place to place. Threatening attitudes and gestures accompanied with the brandishing of knives and the firing of guns made life miserable for the prisoners, whether on the trails or in the camps. Noted Indians at the agency massacre, as learned by these women travelers, were Jim Johnson, Charlie Johnson, Douglass, Persune and Ebenezer. Jack was fighting over in the Milk Creek Cañon. Mrs. Price and Josephine were used especially as drudges, carrying wood and water, while Mrs. Meeker was singled out as an object of unusual and violent abuse. The excitement of the hour brought on frequent discussions in camp among the Indians themselves. The cavalcade, augmented by returning braves, as it approached Grand River Valley, was two miles in length. The long journey was made over an exceedingly rough and dusty trail. The women, on uncomfortable ponies, suffered intensely, and especially because they were without food or water for long periods at a time.

The news of the massacre and the captivity of the women swept over the whole country; and, from Secretary Carl Schurz at Washington, came the order for Gen. Charles Adams of Denver, formerly agent of the White River Utes, to pursue the captive-holding band and rescue the prisoners, if alive. From the camp on the Grand the procession had briskly moved southward to Los Pinos,

toward which locality Adams hastened. Accompanied by certain officials and a few friendly Indians, Adams made his way hurriedly over the old trails to Ouray's camp, and, bearing orders from this head chief that all hostilities must cease and the prisoners be delivered to their friends, he arrived in due time at his destination, presented his papers, and demanded the prisoners. Disposed at first to disobey the mandate of Ouray, Douglass relented and agreed to deliver the captives on condition that the advance of Merritt's army would be stopped. This was agreed to, and the prisoners were taken to Ouray's camp, where the noted chief and his wife, Chipeta, did everything in their power for the comfort of the captivity-released group. After a few days the sufferers were brought to Denver and then sent to their former homes in Greeley.

During those anxious exciting weeks, the scattered population of the Colorado Rockies was deeply disturbed and intensely agitated over the situation. An outbreak of the whole Ute aggregation was hourly feared, and no one could predict where the first murderous assault might break forth. Day after day and week after week General Merritt remained with his troops at the agency until three long months had been consumed by white and Indian leaders in striving to obtain facts regarding the guilt of the participants in the White River outbreak. Those long continued efforts were of little avail, for practically all of the guilty leaders escaped and found refuge in the camps of distant allies. Retribution, therefore, never reached the participants in the massacre, but by act of Congress the Utes of the White River Agency were later assigned to the Uintah Reservation in Eastern Utah.

Before the first decade of Colorado statehood had passed the Indians of the plateau regions had been gathered into reservations, here and there, out on the extended plains; and the tribes of the mountains had been concentrated into groups and crowded into reservations at various places on the crest of the continent—all to live their lives in peace, and gradually to come into possession of land and hold it in severalty, to adopt slowly the white man's manners, and to grow into the white man's mode of living.





